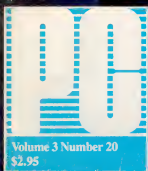


THE INDEPENDENT GUIDE TO IBM PERSONAL COMPUTERS



October 16, 1984

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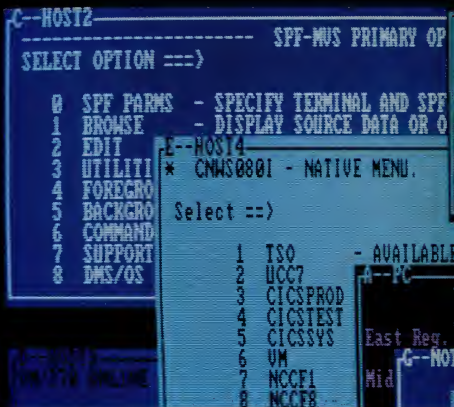
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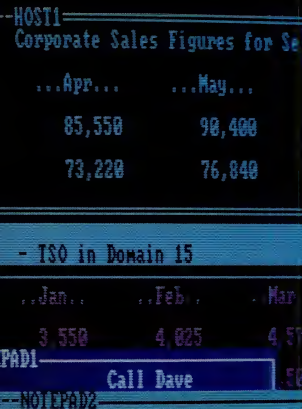


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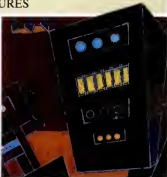
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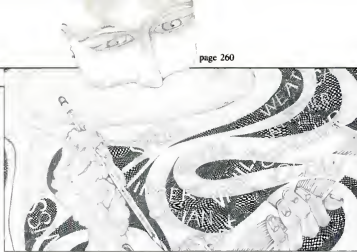
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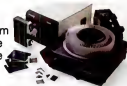
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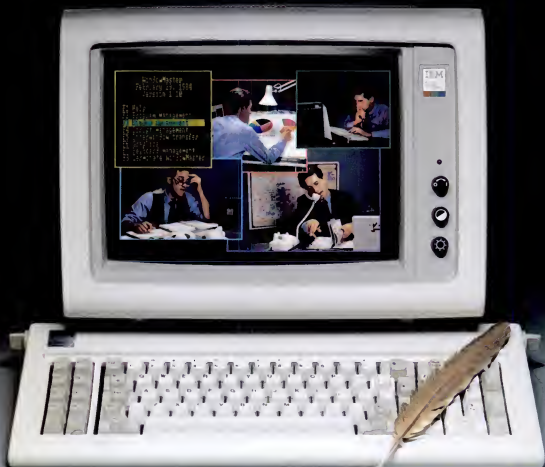
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CIRCLE 219 ON READER SERVICE CARD



What's Inside

This issue's cover package examines on-line databases, those handy purveyors of information guaranteed to run your phone bill into figures unequalled even during your teen years.

How long ago was it that your parents used to complain about the time that you spent on the telephone? (This question applies to former teenagers of both sexes: when my brother was 15 his idea of a good time was to have an hour-long conversation with the overseas operator.) Weren't they glad when you reached the ripe old age of 21 and had presumably gone on to more adult means of communication—like job interviews?

Well, apparently your parents and mine didn't foresee the possibilities for telephone use created by the microcomputer and its handy little cousin, the modem. Because once it became a simple matter to send streams of digital information across the phone lines, computers began talking to each other with an enthusiasm and at a length that would daunt the most feckless adolescent.

Modems

Most of you probably remember the beginning of this new communications cacophony, when you had to dial your number, wait for the highly unpleasant squeal that modems tend to emit, and then place the phone into a rubberized cradle. This method was obviously undesirable (and, considering the amount of noise that usually found its way into your transmissions, also inefficient). Luckily,



computer companies recognized the problem and came up with a way to eliminate the awkwardness of acoustically coupled modems and make the machines do all the work. They aptly called the device a smart modem.

As John Helliwell tells us in his article "On-Line with Smart Modems and Software," these clever pieces of hardware not only flick the modem cradle into the forgotten reaches of history but enable users to keep their fingers off the phone and on the keyboard by sending and receiving calls with a minimum of human intervention. And of course, software writers have kept up with the trend toward automation, producing programs

that can literally carry on (digital) conversations by themselves.

Information, Please

Of course, most of the data you and your microcomputer access this way are useful and necessary, such as the financial and stock market reports generated by such respected institutions as Chase Econometrics and Wharton Economic Forecasting Associates. Almost by definition, these on-line databases are complex and difficult to access. While you may be a Wall Street whiz who fully understands how this country's economic system works (placing your IQ somewhere on the genius level), you may still quail at the thought of having to respond to a command request appearing on your computer screen.

Recognizing this widespread anxiety, we asked George Hayles, a free-lance writer who has just completed a book on using the PC for stock market investment analysis, to help you out. Hayles' article, "Dialing for Financial Data," should prove invaluable to anyone wrestling with these new information sources.

Another good coach in any database/user wrestling match is Alfred Glossbrenner, who wrote a series of books on computerized telecommunications. We asked Glossbrenner to give you tips on finding your way through the most popu-

WHAT'S INSIDE

lar on-line databases with minimum effort and maximum effect.

Jared Taylor, a PC contributing editor, is also familiar with telecommunica-

tions. He's contributed a piece entitled "On-line House Calls," in which he covers the best informational databases. In a more narrowly focused article, Mark

Harris examines Newsnet, the first on-line database that gives subscribers full access to a multitude of special-interest newsletters dealing with almost every imaginable subject.

Writer Tim Miller wasn't content to simply access the Nexis on-line database system. He actually took a trip through the Nexis offices for a behind-the-scenes look at how all the data get from a written source onto your microcomputer's screen.

Stranger than Fiction

All these on-line databases are worthwhile. However, those that grew up with the phone plastered to their ear could not be content with using microcomputer communications simply to do business. Associate editor Barbara Krasnoff, for example, wasn't interested in collecting the latest stock prices from Wall Street or the most recent news about microchips. As an excuse for dialing up the really unusual on-line resources, Krasnoff wrote "Databases: Believe it or Not," in which she examines a few of the lesser-known on-line sources. Would you believe an on-line database named Big Brother?

For the totally outrageous, you can't do better than the bulletin board systems. Those purveyors of information, gossip, opinion, and just plain weirdness have produced phone bills of such impressive magnitude that many of today's parents are seriously reconsidering the desirability of owning a telephone. We certainly could not neglect what amounts to a not-so-underground microcomputer movement, and so we asked David Stone to give us the rundown on "Posting a Message On-line."

When Alexander Graham Bell sent his first words spinning down a length of wire, he could never have foreseen the immense effect telecommunications would have on society or on the thousands of computer users who now find themselves in daily contact with on-line databases. ■

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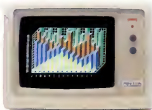
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IBM News

FROM THE EDITORS OF PC

OCTOBER 16, 1984

Rocket PC AT Is What Power Users Want

'A superlatively capable, diabolically fast, competitively priced marvel'

BY PAUL SOMERSON

NEW YORK—IBM's newest addition to the PC family is such an impressive box that it's worrying even the nation's mini-computer manufacturers—and it has thrown the whole micro-computer market for a loop.

Built around Intel's high-performance 80286 chip running at a fast 6MHz (compared with the PC's 4.77 MHz), the AT eclipses the abilities of every other personal computer on the market, boosting the speed of typical PC applications two to three times. Its two optional 20-megabyte hard disks can salt away four times as much data as the PC-XT and access it more than twice as quickly. Even its standard floppy now can hold 3.33 times as much as the typical 360K disk (although this high-density drive and its special disks create some compatibility problems).

By IBM's own admission, for these and other reasons, only 75 percent of the software it tested would run on the AT.

The system board sports eight expansion slots (one is occupied by a combination hard/floppy disk controller), six of which can handle 16-bit add-on cards. Again, you may have a small compatibility problem if you try



to use more than two add-on boards that have "skirts." (A skirt is an extension of the circuit board down past the normal lower edge; IBM's color/graphics adapter has one.) Slots for the 16-bit cards use two sockets rather than the conventional single socket, and one side effect is the newer socket prevents boards with skirts from being plugged in.

IBM is offering 512K memory expansion cards (at a hefty \$1,125) that can add up to a massive 3 megabytes of on-board

(continued)

IBM Switches to Sytek's Broadband for PC Network

At 2 megabits per second, IBM's \$695 card gives new LAN options

BY BILL MACHROME

NEW YORK—IBM has introduced PC Network, and what a network it is. After a year or more of watching the other networks in the PC marketplace,

IBM teamed up with Sytek, Inc., of Mountain View, Calif., to develop a high-performance, broadband network using coaxial cable and carrier-sense colli-

sion-detecting techniques.

Industry watchers wondered aloud if this was the same IBM that gave us the mediocre PC

(continued)

Amazing PC AT (continued)

RAM. This added memory can be used as a virtual disk by the new DOS 3.0 or for multi-user access under PC XENIX. Third-party vendors have already indicated that you may soon see 4-megabyte cards populated by 256K chips (rather than the 64K RAMs on the PC), which will give you the full 16 megabytes of on-line RAM the 80286 can address.

The 80286 chip, which several sources claim IBM is manufacturing itself under license from Intel, boasts an instruction set that is upwardly compatible with that used by the 8088 inside the PC, PCjr, and PC-XT. This microprocessor runs in two modes, "real" and "protected."

In the real mode, the chip acts just like a faster 8086, and can address only 1 megabyte of memory. In the protected mode, the chip can address 16 megabytes of memory, and supports multitasking, with concomitant memory management, task management, and memory protection. An 80287 math chip can support advanced floating point calculations in both modes.

Priced Right

IBM sells the AT in two configurations: a stripped-down version with 256K of RAM and one 1.2 megabyte "high-density" half-height floppy disk drive for \$3,995, and a version that will undoubtedly become the more popular, with 512K of RAM (the additional 256K is physically piggy-backed atop the standard 256K), the high-density floppy, a combination serial/parallel adapter, and a 20-megabyte hard disk, all for \$5,795.

Users can purchase a second optional drive, and many will. The hard disk is housed in the center of the chassis, behind the extended ventilation grille, leaving room under the high-density floppy drive for another 1.2-megabyte floppy, another 20-megabyte hard disk, or a conventional 360K half-height. By installing another hard disk, you can have ready access to a whopping 40 megabytes of lightning-quick storage all in one cabinet.

Corporate Machine

Most users will likely end up with drives of three different sizes. Businesses will flock to the enhanced model, which comes with one high-density floppy and one hard disk. But while the high-density drive can read from and write to 360K disks, it writes such a narrow track that the disks may not be

The PC key above the tab is Esc, which drove BASIC users to distraction when they tried to enter a 1 or hit F2 or the tab key and wiped out their entire line by hitting the Esc key instead. On the AT keyboard, the Esc key is to the right of the backspace, which has shrunk a bit. This new location makes sense, but takes some getting used to.



usable on PCs and PC-XTs.

In addition, since many software packages rely on 360K drive timings or customized 40-track sector and track configurations for their copy-protection schemes, these programs will not load and run properly on the new 96-track high-density floppies.

The system is powered by a beefy 192-watt power supply cooled by a variable-speed fan—the hotter the air inside the chassis, the faster the fan turns. The power supply is switchable between 120 and 220 volts for transglobal use, and there are five new DOS files that reconfigure the keyboard for European key layouts.

The AT also comes with a lock that prevents unauthorized tampering. A user can start a long process, turn the key to the locked position, and walk away. The computer will continue to work, but the keyboard is locked.

Dream Keyboard

Another well-engineered AT feature is the new keyboard. IBM evidently listened to users' complaints, since the AT keyboard fixes virtually every major gripe.

The key layout is now very close to the Selectric standard pioneered by IBM on its typewriters. The J-shaped Enter key is enormous, and the tilde/grave key that got in the way of the PC's Enter key has been banished to the spot above the tab.

The number pad is now separated from the main body of the keyboard by the same kind of metal divider that segregates the function keys.

The loudest complaint voiced by new PC owners was that the PC's shift keys were in the wrong place; on the AT they are fat and properly placed at the ends of the bottom row.

This new right-end top-row sequence of Backslash, (tiny) Backspace, Esc, NumLock, ScrollLock, and SysReq (a new, 84th key that doesn't do anything yet and is primarily for multiuser operation) will no doubt be the new store subject.

Light Indicators

It was comforting on the PC to grope for the Ctrl-Break key combination when your system started spinning out of hand; now the same hand-brain action will produce Ctrl-SysReq, which does nothing. After a few minutes, I became comfortable with all the new key positions except one—the gray dedicated minus sign key is now directly beside the cursor-right key, and my attempts to move the cursor to the right often produce rows of hyphens instead.

At the upper righthand corner of the keyboard are three toggleable green LEDs that report the state of the CapsLock, NumLock, and ScrollLock keys. While lack of such indicators was not an earth-shaking problem, the few users who screamed about it should be

mollified. Finally, the keyboard comes with a far longer cord than on the PC's version.

Overall the keyboard has the same clean look, snappy sound, and solid feel as that of the PC, but the improvements are genuine and welcomed. It's about as close to perfect as it can be. Everyone should be delighted except the folks at Key Tronic...and the PC and PC-XT users who want to plug this new keyboard into their non-AT systems—it won't work. The AT uses a bidirectional serial interface that the PC and PC-XT can't handle.

Incompatibilities

On the back wall of the chassis is a battery pack that powers a standard clock/calendar and 64 bytes of CMOS RAM. A setup program queries you during installation of the system, and stores all of the system configuration data, so the AT doesn't require banks of hard-to-get-at DIP switches as do the PC and PC-XT. The only switch on the motherboard sets the default for the type of boot-up display.

Most of the existing IBM PC add-on hardware—including the serial adapter, parallel printer adapter, memory expansion options, and disk drives—will not work on the AT. A single short-board serial/parallel adapter provides the necessary ports, and new 16-bit memory cards are required. You can also purchase a Floor Standing Enclosure that tilts the AT on its end and takes it off the desk; this item may become popular since the AT is larger in every dimension than its predecessors.

The AT will not recognize its hard disk unless the system boots with DOS 3.0, but can run older versions of DOS disks on its floppy drives.

There's only one word to describe this machine—awesome. Once you watch this rocket ship maneuver, you won't be able to use a PC or a PC-XT again; those older machines run like antiquities next to the AT. It is a superlatively capable, diabolically fast, competitively-priced marvel bound to rock the entire industry. Instead of "AT," IBM should have named it the "Shakout."

IBM's Network (continued)

Cluster just months ago (see "Transfer Rates Make IBM's Cluster Less Network, More File Copier," *PC*, Volume 3 Number 17, page 59). Nor does the PC Network bear a family resemblance to the twisted-pair IBM Cabling System (see "IBM Puts Its Network on Hold," *PC*, Volume 3 Number 13, page 53) intended for large-scale office automation. Although it was announced with the new PC AT in August, the new network will not be available until the first quarter of 1985.

Although not the fastest network, PC Network makes a respectable showing at a transfer rate of 2 megabits per second. 3Com's EtherSeries is the current PC speed champ, with a 10-megabit data rate. Most offerings clock in at around 1 megabit.

Inter-PC communications are handled by a \$695 network controller card that will plug into either a PC AT or a normal PC or XT. The network also requires a \$595 "Data Translator," which retransmits "sent" data on the "receive" frequency. There is processing power aplenty on the board, including an 80188 processor and an Intel communications controller chip.

Broadband Benefits

The broadband nature of PC Network has interesting capabilities, some of which IBM demonstrated in its New York debut. The PCs on the network communicate over the coaxial cable as if they were radio stations, receiving on one channel and transmitting on another. Like the cable that brings TV signals into many homes, the network can handle many more channels than the two allocated for data.

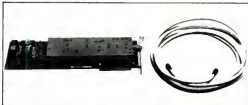
IBM demonstrated half a dozen PCs and PC ATs hooked up to a single cable. An entire cable TV system was also hooked up to the cable, as were various TV cameras, a laser disk player, and some TV sets. You could tune the broadcast channels, scan the laser disk, and control the operation of the cable TV system from a PC AT's keyboard, all without delay or interference with the ongoing

data exchange. The demo system used roughly 20 percent of the cable's capability.

The point was elegantly clear: Data communications and video teleconferencing are feasible, even economical, within the confines of a single cabling system. Not that IBM is offering a specific teleconferencing product, but the combination of

With appropriate amplifiers, the system can be extended over many miles, interconnecting up to 1,000 PCs.

The card itself fits into either the PC or a PC AT, the designers having chosen not to avail themselves of the additional card height in the PC AT. It sports an 80188 processor and the Intel 82586 communications control-



An IBM PC Network Adapter comes with a 9-foot section of coaxial cable.



The PC Network Translator Unit directly connects up to eight PCs.

broadband cable and IBM support makes the field inviting to third parties. The cable can also be put to more mundane uses, such as security monitoring.

Large companies that have been deferring teleconferencing and networking decisions will be interested in the potential for adding networking to their in-house CATV systems. Others will find the combination of the two attractive.

Technical Side

The basic hardware will allow up to 72 PCs in a 1,000-foot radius to be interconnected.

ler. The 188 actually runs the board, drawing on programs stored in a 32K ROM. It buffers information in 16K of on-board memory. The 82586 controller chip helps manage the communications protocols on the network.

One small ROM on the circuit board contains an ID code. Every board has a unique code or serial number, with which the user need never be concerned. The setup software will take that code into account during installation and identifies the node to the rest of the network with a customized label, such as

"Jill's XT."

The data translator, IBM's PC Network Translator Unit, can be connected directly to as many as eight PCs.

DOS 3.1

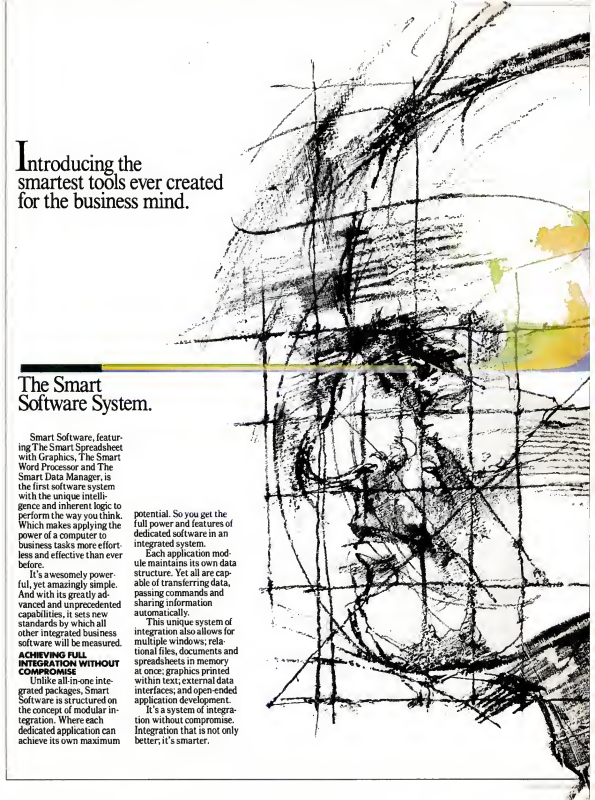
One of the reasons that PC Network won't be available until the first quarter of next year is that work remains to be done on DOS 3.1 and the IBM network software. When it's finished, users will be able to read files and direct printer output around the network using labels like the one above. There are already provisions in DOS 3.0 for sharing files and controlling read-only status, but the full implementation will come with the next version.

Another attractive feature of PC Network is that it doesn't require a dedicated server. Any hard-disk PC or AT with 256K or more can be a server, a boon to companies with an existing investment in XTs. This feature is not unique to PC Network; it is found in other systems such as PCNet, offered by Orchid Technologies, AST Research, and Santa Clara Systems. But the PC Network implementation appears to be more sophisticated, given its ability to label each node and the overall capacity of the network.

Growth Potential

IBM's published documentation on PC Network is thorough and complete. It gives all the interface routines, assembly language listings, and pseudo-code necessary for vendors to interface their software to the network. This open-door policy is an invitation for software manufacturers to port multi-user versions of their products to PC Network. The documentation even includes a complete glossary, introducing and explaining terms that might otherwise be unfamiliar to software developers.

Although PC Network is obviously a radical departure from the forthcoming IBM large-system network, its approach appears to work well for PCs. The network is obviously not a stopgap measure, but a well-thought-out and sophisticated product. ■

An abstract background drawing featuring a grid of thin, intersecting lines. Overlaid on this grid are numerous dark, heavy, and expressive scribbles and strokes, some of which are thicker and more concentrated than others. In the upper right quadrant, there are patches of yellow and green color, suggesting a watercolor or paint application. The overall effect is one of dynamic, layered complexity.

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IBM Looks to Future With TopView Windows

NEW YORK—The three hottest software topics these days are probably multitasking, using windows, and making all applications friendlier. At the recent AT introduction, IBM announced a soon-to-be-released (probably in January) package called TopView that performs all of these functions with flair and ease.

This new "operating environment" is likely to become increasingly important as a user-friendly shell for IBM's operat-

Only one program at a time can be in the "foreground" where it interacts with the keyboard, but other programs can perform at the same time if no keyboard support is required. This means users can edit one file while they print another, sort a third, and send a fourth over a modem.

TopView lets users switch quickly among all the loaded files through pop-up menu selection or keyboard or mouse input. And the program also allows users to move data from

so quickly and is so responsive that a mouse is almost necessary for efficient operation.

TopView should appeal to the entire range of users, since its menu-driven DOS abilities will make it a snap for the novice or casual user to perform complex DOS tasks, and its windowing and multitasking capabilities will appeal to the expert user. Also, it offers features not readily available in DOS, such as displaying directories sorted by extension, size, filename, or date with one or two keystrokes.

TopView will work on all IBM Personal Computers, although IBM says it won't support it on the PCjr. It requires DOS 2.0 or higher and supports both monochrome and color displays. However, not every program will run under TopView. IBM sells a separate *TopView Programmer's Toolkit* package to software developers

in the hopes that all new software releases will conform to the TopView standards and take full advantage of its abilities.

The program comes with a decent interactive on-disk tutorial that steps users through the entire TopView process. TopView does have problems windowing graphics programs or running several graphics applications simultaneously, but these limitations may be corrected in future releases.

TopView is an extremely powerful, flexible, and friendly package. Many observers feel it will become the standard DOS interface in the future or will be closely integrated into upcoming DOS revisions. It is also another sign that IBM's relationship with Microsoft (which has its own windowing environment—not one adopted by IBM) may be more hazy than it once was. —Paul Somerson



ing systems. IBM Entry Systems president Philip Estridge called it "a key foundation for future applications" and suggested that it will be very widely used on the entire PC family, including 3270 emulators and the new PC Network.

TopView will simplify IBM's PC operation because users can perform all necessary operating system functions by selecting menu choices rather than entering specific and often difficult-to-remember commands. It puts such menus on windows that "pop" onto the screen at appropriate times and then vanish without disturbing the underlying text or graphics once a menu item is selected.

Multi-files

Users can load several different software applications into memory (limited only by the amount of RAM in the system) and run them simultaneously.

one file to another through a memory buffer, using methods similar to the cut-and-paste (or "block" move, delete, and copy) operations of word processors.

Different applications can run in different on-screen windows, and TopView makes it easy for users to change the size and number of the windows and move them anywhere on the screen. It can also scroll data in any window and zoom windows up or down in size.

Audience Appeal

Until the release of TopView, mice were curious but not overly useful cursor moving devices—which IBM had shied away from. But TopView should catapult the mouse to stardom, since many of the cut-and-paste and window moving operations are handled far faster with mouse input than with conventional cursor keys. The program works

IBM Better BASIC Book

New BASIC 3.0 manual has it all

NEW YORK—For some present PC owners, the best news in IBM's PC AT announcement is that IBM printed a new manual for BASIC 3.0—its first fully revised manual since BASIC 1.1, over 2 years ago.

Sure, IBM has released other BASICs since 1.1. The XT was accompanied by BASIC 2.0, and the PCjr brought BASIC 2.1 to the rest of IBM's line. But these updated programs still came with a manual first published in May 1982. If you wanted to learn about BASIC's new commands and features, you'd have to send IBM an order form—casually overlooked in the DOS manual's wrapping—to receive a package of supplementary pages.

This process puzzles us: If IBM could put an order form in the DOS manual, why couldn't it instead have slipped in the appropriate package of pages and saved the customer a lot of trouble?

The manual for BASIC 3.0 does the job right, at last. It can be used as a reference for all previous versions of BASIC; the text clearly indicates the

earliest version of BASIC that provides each new command or feature. (The PCjr's Cartridge BASIC isn't covered here, since many of that computer's sound and graphics features aren't available on the PC, XT, or AT.) New commands in 3.0 include IOCTL, ENVIRON, and SHELL.

IBM's new BASIC manual (called the Third Edition, dated May 1984) is available for \$40. If you want to step up to BASIC 3.0, the program is included on the disk for DOS 3.0, priced at \$65. For another \$40, you can get a *DOS 3.0 Technical Reference*, which inherited half of the sections that were crammed into DOS 2.0's single manual.

Don't throw away your old books when you get fresh manuals from IBM. We've noticed that several items disappeared when IBM shuffled its pages. One casualty is a list of expressions that act as advanced mathematical functions, which once appeared as appendix E in the old BASIC manual. As usual, you win some, and you lose some.

—James Langdell

DOS 3.0 Is Bigger, but Only Manual is Better

PC AT and high-density diskettes precipitate changes in latest DOS, but the goodies are hidden in coming DOS 3.1

BY PAUL SOMERSON

NEW YORK—IBM PC and PC-XT owners who want to keep absolutely current with IBM's latest offerings will be sorely disappointed in DOS 3.0.

Software revisions with higher numbers to the left of the decimal point are generally quite different from their predecessors. DOS 2.0 offered such powerful features as hard disk support, tree-structured directories, redirection of I/O, and a vastly enhanced BASIC. But while DOS 3.0 includes a small handful of new features, none is a radical departure from DOS 2.1. In fact, IBM states in its documentation that "DOS 3.0 does not replace DOS 2.1."

IBM released DOS 2.0 when it announced its PC-XT; earlier versions would not support the XT's fixed disk, and many changes were required to operate the new hardware. Similarly, the primary function of DOS 3.0 is to provide the necessary hardware support for the PC AT's new disks—the 1.2-megabyte floppy and the optional pair of 20-megabyte hard disks—and Intel 80286 chip.

Fatter Files

In fact, PC and PC-XT users with smaller systems may find that DOS 3.0 will not run their current applications. The 3.0 DOS system files take up 36K of space rather than the 24K of DOS 2.1. This space consumption can create severe problems on machines with 64K of RAM, and IBM recommends that DOS 3.0 not be used on systems that have less than 96K (or less than 128K with a hard disk).

The far-fatter DOS files don't really do much more than their 2.1 counterparts. Much of the extra space is taken up by pro-

gram code specifically designed for file-sharing abilities that won't be implemented until the already-announced DOS 3.1 is actually available in January 1985.

Apparently, IBM was preparing a DOS update that could run the AT and allow users to share files, but hadn't completely developed the network hooks at the time of the AT introduction. Since earlier versions of DOS couldn't handle the AT's new hardware, IBM had to release a version of DOS that could, but incidentally was loaded with network code that didn't do anything except take up extra room.

New Commands

DOS 3.0 does fix some nasty 2.1 problems where careless users could mistakenly format their hard disks. The new FORMAT command also allows users to initialize the new 1.2-megabyte, high-density diskettes. And the disks in the newly redesigned DOS 3.0 manual contain a dozen extra files, including:

- ATTRIB—Lets users manipulate one bit of the attribute byte to make files be "read-only" so they can't be changed or erased.
 - LABEL—Lets users add or change the volume label on their hard disks and floppies.
 - SELECT—Gives users in foreign countries the ability to customize their IBM keyboards for their particular key layouts.
 - SHARE—The first implementation of a file-sharing system; this should be developed further in subsequent DOS releases.
- DOS 3.0 also emphasizes configuring systems with the CONFIG.SYS file more than

did earlier releases. DOS 2.x users relied on CONFIG.SYS only to increase the amount of buffer space, load in ANSI-SYS, change the way the system looked for the Ctrl-Break combination, or do such exotic operations as create their own device drivers. Information on this file was buried at the very back of the DOS 2.0 manual and omitted from the 2.1 manual.

Now this configuration process is adroitly explained in a new section in the DOS 3.0 manual. Solid explanations are provided for many of the trickier capabilities, and you can now do things like specify the date/time format used in foreign countries, install the new DOS VDISK driver that turns unused memory into a virtual disk (also known as a RAMdisk, a memory disk, or a superdrive), and specify other important details to make your PC more efficient.

Manual Improvements

The DOS 3.0 manual is a significant improvement over previous editions. Housed in a new gray binder, it is better organized, better looking, and easier to understand. It comes with a quick reference card and a small *User's Guide* pamphlet that does a good job of stepping frightened new users through the minefield of DOS. However, its repeated use of a cartoon bird is wholly incongruous and a bit offputting for the stolid business types who will be using the AT.

Most of the even vaguely technical sections from the old DOS manuals have been banished to a new *DOS Technical Reference Manual*. This makes the familiar *DOS Reference Manual* skinnier and less forbidding. But it does force users

to spend a few more dollars for the more technical supplement, if they need it—most won't.

BASIC is also largely unchanged. While it does offer a paltry few new commands and abilities, most users probably won't find them very interesting, with the possible exception of the SHELL command, which will let them perform DOS operations such as copying or sorting files while in BASIC. This is indeed a powerful new feature, which has been around in undocumented form in earlier releases and should become very popular.

Update Changes

One caveat is that IBM no longer supplies new BASIC update pages with new DOS revision. It forces users to order such supplements by mail, which can take a month or more. And, the *BASIC Reference Manual* is now just that: IBM moved all of the important introductory material that appeared in earlier manuals into a slender paperback book called the *BASIC Handbook*, leaving just an alphabetical listing of all commands and statements and several appendices in the khaki binder. The BASIC 3.0 package now also contains a handy pocket-size *Quick Reference* booklet. The DOS and BASIC manuals now come in so many little pieces that the little books tend to disappear.

Other new commands and code changes let users interact with device drivers while in BASIC, perform complex path changes, zero in on DOS errors, and handle all the new AT hardware. However, there are no other significant changes in the fundamental functionality of BASIC.

Current speculation is that IBM will soon release a new color board based on an ultra-sophisticated NEC/Intel graphics chip, offering such features as 1024-by-1024 graphics. When IBM announces this board, it will have to radically alter much of BASIC. Until then, BASIC 2.1 will perform adequately for all PC and PC-XT users. There's no real reason for anyone but AT owners to upgrade to DOS 3.0. ■

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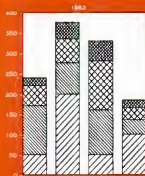
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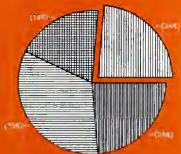
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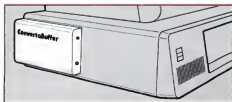
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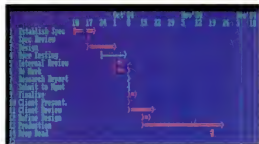
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- | | |
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| <input type="checkbox"/> 2. Manufacturing other | <input type="checkbox"/> 10. Health, medical service |
| <input type="checkbox"/> 3. Agriculture, mining, construction | <input type="checkbox"/> 11. Legal |
| <input type="checkbox"/> 4. Transportation | <input type="checkbox"/> 12. Education |
| <input type="checkbox"/> 5. Communications | <input type="checkbox"/> 13. Data processing, computer service |
| <input type="checkbox"/> 6. Computer related retailer | <input type="checkbox"/> 14. Other business services |
| <input type="checkbox"/> 7. Non-computer related retailer or wholesaler | <input type="checkbox"/> 15. Government |
| | <input type="checkbox"/> 16. Consultant |
| | <input type="checkbox"/> 17. Other (please specify) |

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- | | |
|--|--|
| <input type="checkbox"/> 1. Pres./Owner/Dir./Chmn./Partner | <input type="checkbox"/> 15. Dir./Mgr EDP/MIS Operations |
| <input type="checkbox"/> 2. Vice-Pres./Gen Mgr | <input type="checkbox"/> 16. Dir./Mgr Information Ctr |
| <input type="checkbox"/> 3. Controller/Treasurer | <input type="checkbox"/> 17. Business Microcomputer Specialist |
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| <input type="checkbox"/> 5. Chief Accountant | <input type="checkbox"/> 19. Data Base Administrator |
| <input type="checkbox"/> 6. Vice-Pres Operations | <input type="checkbox"/> 20. Vice-Pres/Dir R&D |
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| <input type="checkbox"/> 14. Dir./Mgr Communications | <input type="checkbox"/> 28. Other (please be specific) |

5. Do you have any MAINFRAME computers or MINICOMPUTERS on site at this location?

- ☐ Yes (If yes, please report accurately below for the two largest.)
- ☐ No

Manufacturer	Model	Quantity

IBM or Compatible Personal (Micro) Computer Information for this location:

(Please report accurately for each model indicated)

Manufacturer's Name, Model	6. Currently Owned (Quantity)	7. Plan To Purchase Within			
		0-12 Months (Quantity)	13-24 Months (Quantity)	25-36 Months (Quantity)	37-48 Months (Quantity)
IBM PC					
IBM PC XT					
IBM XT/370					
IBM PC/3270					
IBM PCjr					
IBM Compatibles (Compag, Engle, etc.)					
Other (Not IBM or Compatibles)					

7a. In which of the following ways are you yourself involved with the Personal (Micro) Computers at your location?

- | | |
|--|---|
| <input type="checkbox"/> A. Use them | <input type="checkbox"/> F. Other Involvement (specify) |
| <input type="checkbox"/> C. Establish specifications | |
| <input type="checkbox"/> D. Approve purchase | <input type="checkbox"/> G. No involvement |
| <input type="checkbox"/> E. Acquire them | |

8. The Personal (Micro) Computers purchased for this location would be:

- ☐ 1. For internal use
- ☐ 3. Other (please specify)
- ☐ 2. For resale

Full company name and company address must appear in spaces below for application to be processed.

OR AFFIX YOUR BUSINESS CARD PW 1188

Name	
Title	
Company Name	
Division	Telephone Number
Company Street Address	
Company City	State Zip

8a. How are Personal (Micro) Computers normally obtained for this location?

- | | |
|--|--|
| <input type="checkbox"/> A. Direct from manufacturer | <input type="checkbox"/> E. System house |
| <input type="checkbox"/> B. Manufacturers representative | <input type="checkbox"/> F. In-house (company) store |
| <input type="checkbox"/> C. Distributor | <input type="checkbox"/> G. Other (please specify) |
| <input type="checkbox"/> D. Retail computer store | |

9. Please indicate below the communications capability for which these Personal (Micro) Computers are used.

- ☐ A. Communicate with remote timesharing or database.
- ☐ B. Communicate with internal mainframe or minicomputer.
- ☐ C. Use in local area network.
- ☐ D. Down load data from mainframe or remote service.
- ☐ E. None of the above.

9a. Please indicate below the applications for which these Personal (Micro) Computers are used.

- | | |
|---|---|
| <input type="checkbox"/> 1. Accounting | <input type="checkbox"/> 9. Graphics Design |
| <input type="checkbox"/> A. Accounts Payable | <input type="checkbox"/> 10. Personal Time Management |
| <input type="checkbox"/> B. Accounts Receivable | <input type="checkbox"/> 11. Portfolio Management |
| <input type="checkbox"/> C. Billing & Collection | <input type="checkbox"/> 12. Programming |
| <input type="checkbox"/> D. General Ledger | <input type="checkbox"/> 13. Project Management |
| <input type="checkbox"/> E. Inventory | <input type="checkbox"/> 14. Process Control |
| <input type="checkbox"/> F. Order Entry & Invoicing | <input type="checkbox"/> 15. Scientific or Engineering Applications |
| <input type="checkbox"/> G. Time Billing | <input type="checkbox"/> 16. Statistical Analysis |
| <input type="checkbox"/> 2. Communications | <input type="checkbox"/> 17. Tax Calculation or Planning |
| <input type="checkbox"/> 3. Data Base Management | <input type="checkbox"/> 18. Word Processing |
| <input type="checkbox"/> 4. Data Input/Analysis | <input type="checkbox"/> 19. Other |
| <input type="checkbox"/> 5. Education | |
| <input type="checkbox"/> 6. Electronic Mail | |
| <input type="checkbox"/> 7. Entertainment (Games) | |
| <input type="checkbox"/> 8. Financial Planning | |

10. Do you help acquire, recommend, specify or approve any of the products or services below?

- ☐ Yes (If yes, please check all that apply)
- ☐ No

Computers

- ☐ 1. Mainframe
- ☐ 2. Minicomputer
- ☐ 3. Personal (Micro)

Peripheral Equipment

- ☐ 7. Letter Quality Printer
- ☐ 8. Graphics Printer
- ☐ 9. High Speed Printer
- ☐ 10. Color Monitor
- ☐ 11. Monochrome Displays
- ☐ 12. Modems
- ☐ 13. Hard Disk
- ☐ 14. Tape Backup System
- ☐ 15. CPU Compatibility Card
- ☐ 16. Memory Board
- ☐ 17. Communications Port
- ☐ 18. Plotters/Charting Devices
- ☐ 19. Local Area Networks
- ☐ 20. Software/Systems Design
- ☐ 21. Communications
- ☐ 22. Accounting
- ☐ 23. Order Entry/Inventory

24. Payroll

- ☐ 25. Time Billing
- ☐ 26. Financial Planners/Spreadsheet

27. Project Managers

- ☐ 28. Word Processors
- ☐ 29. Compilers
- ☐ 30. Database Managers
- ☐ 31. Program Developers/Generator Tools
- ☐ 32. Business Graphics
- ☐ 33. Maintenance
- ☐ 34. Education/Training
- ☐ 35. Software/Systems Design
- ☐ 36. Remote Computing
- ☐ 37. Database Services
- ☐ 38. Other
- ☐ 39. Other
- ☐ 40. Expendables
- ☐ 41. Diskettes
- ☐ 42. Stock Paper
- ☐ 43. Forms & Other Consumables

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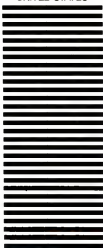
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Is IBM's Super PC Where It's AT?

'It's a powerhouse,' says one dealer who's pushing the PC AT as a standalone micro

BY CHARLES BERMANT

NEW YORK—No doubt about it: the new IBM PC AT will capture a huge share of the multi-user market and make its presence felt as a small business computer. Industry observers disagree, however, about its potential as a standalone machine and whether or not it will take its place next to the VCR in the den of the future.

Furthermore, the AT is causing this fuss months before Microsoft's XENIX, its multi-user operating system, and Top View, its windowing environment, will be available.

The competition says it's not threatened, but the AT's identity crisis is reflected in their reactions: Compaq, a manufacturer of standalone compatibles, perceives the AT as a multi-user machine that will not affect the personal computer market, while a multi-user pioneer Digital Equipment Corp. views it only as a supercharged PC.

"They are trying to address a higher-end market," says Ken Price, who's peddling faster to push Compaq's new Deskpro. "It's an attempt to establish a new standard for multi-users, but will have a limited impact on the current PC market," said the Houston compatible maker's director of corporate communications.

Price added that the AT has "a split personality" and "is not cost effective."

With its portable and desktop products, Compaq has gone head-to-head with IBM, and its new Deskpro clocks in somewhere between the PC and the AT. But Price's sentiment is echoed by stock watcher Michelle Preston, senior vice president of L.F. Rothschild, Unterberg, Towbin in New

York.

"It will have little impact on the standalone market," she says. "It's very sophisticated technologically, but it remains to be seen how successful dealers will be selling it and how profitable it will be. It may establish new standards, but it's not an entry-level machine."

Big, Fast, and Best

Others, however, see the AT as blazing both desktop and multiple use trails.

"There is a certain part of the market that always wants the biggest, fastest, and best," says *Word Perfect* maestro Pete Peterson, executive vice president of Satellite Software in Orem, Utah. "For that segment, the AT is a good machine. Speed is always an asset, I like to see a games-like instant response to our software. With word processing or a database, time is very important."

As for the \$3,995 base price, high for the desktop market but lower than some observers expected, Peterson says, "I don't think the market is so price-sensitive. People are concerned about how much time it will save them. The multi-user operating system isn't even available. Right now, it's just a standalone machine. But a lot of us would still like to have it."

There is also a ready-made minimarket for the AT; the country's 2,000-plus software companies, each of which, Peterson says, will buy one or two. And if a program works on the AT, it will appear faster.

"It's a powerhouse," says Ed Ramos, president of New York's Future Information Systems. "It will be bought as a standalone

(continued)

PC AT Product Prices

System	Price	Availability
PC AT with 256K bytes, 1.2-Megabyte Floppy-Disk Drive	3,995.00	Immediate
PC AT (Enhanced) with 512K bytes, 1.2-Megabyte Floppy-Disk Drive, 20-Megabyte Hard-Disk Drive, Serial/Parallel Adapter	5,795.00	Immediate

New Hardware Options

PC AT 128K bytes Memory Expansion	350.00	Immediate
PC AT 256K bytes Memory Module Kit	495.00	Immediate
PC AT 512K bytes Memory Expansion	1,125.00	Immediate
PC AT 1.2-Megabyte Floppy-Disk Drive	650.00	Immediate
PC AT 20-Megabyte Hard-Disk Drive	1,595.00	Immediate
PC AT 360K-byte Floppy-Disk Drive	425.00	Immediate
PC AT 80287 Math Co-Processor	375.00	Immediate
PC AT Serial/Parallel Adapter	150.00	Immediate
PC AT Serial Adapter Cable	65.00	Immediate
PC AT Serial Adapter Connector	35.00	Immediate
PC AT Floor Standing Enclosure	165.00	Sept. '84
PC AT Prototype Adapter	35.00	Immediate
PC Display Stand	69.00	Immediate

IBM PC Network Hardware

PC Network Adapter	695.00	Oct. '84
PC Network Translator Unit	595.00	Oct. '84
PC Network Base Expander	59.00	Oct. '84
PC Network Short Distance Kit	39.00	Oct. '84
PC Network Medium Distance Kit	79.00	Oct. '84
PC Network Long Distance Kit	89.00	Oct. '84
PC Network 25-Foot Cable	29.00	Oct. '84
PC Network 50-Foot Cable	39.00	Oct. '84
PC Network 100-Foot Cable	59.00	Oct. '84
PC Network 200-Foot Cable	99.00	Oct. '84

Software Applications

PC Network Program	75.00	First Qtr. '85
PC Network SNA 3270 Emulation Program	375.00	First Half '85
PC TopView	149.00	First Qtr. '85
PC TopView Programmer's Toolkit	395.00	First Qtr. '85
PC DisplayWrite 2, 1.1	299.00	Sept. '84
PC DisplayWrite Medical Support	165.00	Sept. '84
PC DisplayComm Binary Synchronous Communications 1.1	375.00	Sept. '84
Macro Assembler 2.0	175.00	Immediate
Office Correspondence Retrieval System	149.00	Sept. '84
Professional Debug Facility	150.00	Immediate
Application Display Management System	150.00	Immediate
Application Display Management System Redistribution	100.00	Immediate

Operating Systems

PC-DOS 3.0	65.00	Immediate
PC-DOS 3.0 Technical Reference Manual	40.00	Immediate
PC-DOS 3.1	65.00	First Qtr. '85
PC Xenix Operating System	395.00	First Qtr. '85
PC Xenix Software Development System	455.00	First Qtr. '85
PC Xenix Text Formatting System	145.00	First Qtr. '85

Publications

PC AT Technical Reference Manual	30.00	Immediate
PC AT Hardware Maintenance and Service Manual	295.00	Immediate
PC AT Guide to Operations	49.50	Immediate
PC AT Installation & Setup Manual	29.50	Immediate
PC Network Technical Reference Manual	195.00	Immediate
PC BASIC Manual 3.0	40.00	Immediate
PC Xenix General Information Manual	1.50	Immediate

Prices in effect at IBM Product Centers.

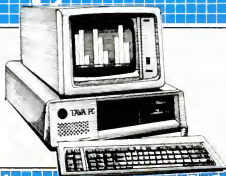
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HiRes Amber	107
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RGB III	399
RGB 420 (IBM)	425
TTL/Green (IBM)	145
TTL/Amber (IBM)	150

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ML 92	419
ML 93	625
ML 84	760
2350/2410	CALL
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Delta 10	389
Delta 15	529
Radix 10	549
Radix 15	679
TOSHIBA:	
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1340	777
SILVER REED:	
EXP 400	\$269
EXP 500	345
EXP 550	409
EXP 770	875
NEC:	
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2010	CALL
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300	205

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Standard Parallel	25
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3M DS/DD/5 1/4	28
BASF SS/DD/5 1/4	19
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CIRCLE 263 ON READER SERVICE CARD

Tate Remembered As Innovator, Friend

'A man you could enjoy grilled shark with'

CULVER CITY, Calif.—George Tate, the pioneering software publisher most noted for marketing the enormously successful *dBASE II*, died this summer of an apparent heart attack. He was chairman and co-founder of Ashton-Tate, the Culver City, Calif.-based software publisher, and cofounder and a principal of Softeam, Inc., a software distributor, and Software Centres International, a franchisor of software-only retail stores. He died August 10 at age 40.

Tate was best known for Ashton-Tate and the popularization of the revolutionary database software, *dBASE II*. During the summer of 1980, Tate and partner Hal Lashlee signed a contract with systems developer Wayne Ratliff to market Ratliff's then-unknown database system called *Vulcan*. Originally named after Mr. Spock's home planet in "Star Trek," *Vulcan* went through several marketing and distribution transformations before becoming *dBASE II*. Over 280,000 units of *dBASE II* have been shipped since its January 1981 introduction.

Born in Tennessee and raised in Greenville, S.C., Tate had an avid interest in electronics. He moved to California in 1973 and first worked as a technician for a large stereo chain. In 1975, Tate acquired an Altair, the first real microcomputer. From there he taught himself enough about digital electronics to earn money repairing computers.

The pieces soon fell together as Tate saw the potential in the microcomputer industry. He worked for Intelligent Systems, manufacturer of terminals and microcomputers, but he soon wanted to start a business of his own. In January 1980, Tate and friend Hal Lashlee launched Discount Software with a capital base of \$7,500. The new company focused on bringing



scarce packaged software to the rapidly growing community of users. The result was Softeam, Inc., one of the first distribution companies to serve as a link between software publishers and retailers.

Softeam is now one of the largest microcomputer software distributors in the country. Tate and Lashlee also pioneered the concept of the software-only retail outlet when they opened the first Software Centre store in West Los Angeles in early 1982.

"You can see George's career and the growth of *dBASE II* as a microcosm of the microcomputer business," says Bill Machrone, editor of *PC Magazine*. "What started out as a hobbyist's pastime ultimately became a serious force to be reckoned with. He cared about the effect of what he was doing."

"George was one of the most genuinely friendly people you could meet," says a friend. "He would get personally involved with customer applications problems and end up in an hour-long conversation." Tate is also remembered by many as "the only man you could enjoy grilled shark with."

Most recently, Tate had focused on the management of Software Centres International.

Tate is survived by his fiancée, Jill Weissman; their daughter, Michelle Nicole Tate; his parents, George and Irene Tate; four sisters; and a brother. He was buried in Garden Grove, Calif.

—Virginia Dudek

Where It's AT (continued)

machine. It should hurt clone-type machines and make it difficult for recent entries to get a viable foothold.

"It raises the ante of the game. Any corporate management information system person will have to buy it based on its future capacity."

"In the past, with the PC and the XT, IBM was not technologically advanced," says David Block, product manager for Morrow's Micro Decision computer line. "Now, for the first time, it is on the cutting edge of technology."

Despite some unknowns such as the type of add-on boards the new machine will use, Block thinks that the AT's presence will ultimately benefit other hardware and software manufacturers. Small companies making add-on boards will have to struggle for a while, he predicted, but it will ultimately drive the price of the next wave of compatibles down.

XT and Jr

As with other eagerly-awaited new products, dealers

are receiving orders for the AT well before its mid-September availability date. Much of the dealer speculation centers around the fate of the PC-XT, which costs only \$700 to \$800 less than the base-price of the AT. Michelle Preston speculates that IBM may not ship many low-end ATs so as not to compete with itself.

The critical response to the AT contrasts with that to the PCjr, which received almost unanimously negative reviews when it was initially introduced last year. The AT, in fact, may end up redeeming IBM in the eyes of dealers dissatisfied with PCjr.

"A lot of dealers feel that IBM has a tremendous effect on the market," says Patrice Johnson, president of the Association of Computer Retailers. "The introduction of the AT follows a trend in a predicted direction. It will provide competition for the new AT&T line of micro and multi-user computers and may stabilize the market. Retailers have a lot of respect for IBM and expect the sales to be good."

Block that Metaphor

"Companies are striving to develop systems that will stymie unauthorized copying but will not hamper the consumer. For example, the Vault Corporation recently introduced a device, called Prolok, that uses a fingerprint on a small disk as a lock. Only the individual with that print can get into the program and unscramble it."

"The Software Piracy Battle" The New York Times, July 31, 1984

What's all this I hear about fingerprints on disks? Users are going to have a terrible time if that sort of copy-protection catches on.

What if the worker with the authorized fingerprint is away on vacation or quits suddenly? The software's useless! If he gets a paper cut, is the computer down until the Band-Aid is ready to come off? And couldn't a pirate break into the software anyway by dusting the keyboard for authorized prints?

Who's going to build and service special tiny drives for those special fingerprint-size diskettes? And don't finger oils and dirt damage the disk's surface quickly? It's going to wear out if someone has to touch it every day.

Why force people to poke their fingers into computers? Instead of using a person's actual fingerprint, why doesn't Prolok use a less cumbersome system, like impressing a unique, unreproducible electronic code on each authorized program disk?

Oh? You mean that's what Prolok's fingerprint really is? Fingerprint is just a metaphor...? You don't really touch the disks? Well, that makes a lot of sense!

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—James Langdell

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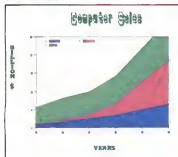
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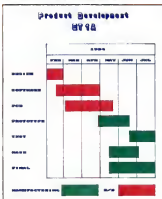
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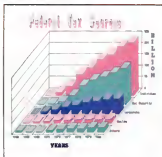
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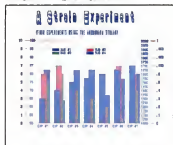
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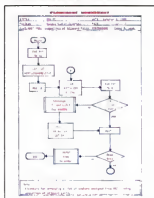
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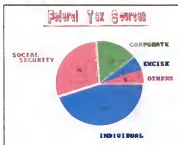
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When PCs Talk, Special Students Don't Play Hooky

'We're really breaking ground,' says New York City educator

BY VIRGINIA DUDEK

NEW YORK—If you can read this page, you are probably not aware of all the things a PC can do. In fact, you could take a lesson from the teenagers at New York City's Norman Thomas and Edward R. Murrow High Schools, where students who were once considered to have "special educational needs" are becoming computer literate in record time.

Jonathan Meachum, at Norman Thomas High School, is developing a file of U.S. Olympic medalists by using a PC and word processing software. He can't reach the top row of numbers because of a physical disability, but the software was reprogrammed so the top row of letters can be used as numbers.

Dawn Shankweiler can't see the keyboard but is one of the first students in the United States to use a voice synthesizer, called Vert, that "reads" whatever is on the screen to her. She and fellow student Andrew Rutherford are mastering the BASIC program language with the help of Vert.

"We're really breaking ground," says Sheldon Rosenberg, senior assistant, high-tech programs and data control, at the New York City public schools. Rosenberg helped introduce computers to special education in New York City, making it the first school system in the country to address the needs of this group of students. With the cooperation of IBM, a special summer workshop was set up, complete with IBM PCs, color monitors, educational software, and IBM training personnel. The equipment is on "permanent loan" to the schools from IBM.

Computers are opening up new doors for students of all ages who may have trouble in a

typical educational environment because of visual, hearing, or physical limitations. New adaptive devices are available that combine such tools as voice synthesis and video enlargement with standard personal computers. These tools enable students to access the computer and provide a new learning environment for themselves.

Currently in use at the New York City schools for the first

times its original size. Most software written for the PC can be used without alteration.

The DPII acts as a camera that interfaces with the PC. Information from the PC monitor appears on the DPII screen and can be enlarged up to 16 times. Ancil Torres, an Edward R. Murrow student who is legally blind, can make full use of the computer.

"You can have the system set



Student Ancil Torres gets help from Visualtek, that enlarges characters on PC monitor.

time are two new adaptive devices:

- The Professional Vert from Telesensory Systems Inc., Mountain View, California, performs voice synthesis, giving the user access to personal computers, word processors, terminals, and mainframe computers. Vert has a 12,000-character memory and has speed, volume, and character control functions.

- The DPII from Visualtek, Santa Monica, California, is a large-print display processor designed for the IBM PC and developed for persons with visual impairments. It is a peripheral device that enlarges the print on the monitor up to 16

up to make it comfortable for you," says Torres, while demonstrating the joystick that moves the information on the screen, controls the size of the characters, and creates a split-screen effect. A book can also be placed under the DPII "camera" to enlarge the print.

Hearing Help

Computers offer additional opportunities for the hearing impaired. A new set of hand signs for the deaf has already been developed, enabling the students to introduce "computerese" into their vocabulary. Once students learned the fundamentals of computers, they were quickly able to apply the

basic skills to different software programs.

Joel Krigsmann, a deaf student at Edward R. Murrow, came into the summer program with some knowledge of computers. He has the math skills to become a computer science major and currently acts as a leader for the group. Students Sharon Miller and Sharon Stevenson, also hearing impaired, developed a file of all the students' names and addresses with the help of the IBM Filing Assistant.

"One of the aspects of special education is using different modalities, such as speech, hearing, and touch," says Dov Rokeach, executive assistant, Special Education for the Brooklyn High Schools. "The computer is an aid to knowledge in that it helps kids, not usually able to write, to write because of the keyboard." For example, Bruce Jackson, a student at Norman Thomas, used to take days to write a letter. It now takes him half an hour on the PC.

Customized Learning

Computers are well-suited to meet the highly individualized needs of special education. "Each student is given a project to work on to develop his or her skills," says Helene Schuster, special education teacher for the hearing handicapped. The diversity of software programs lets students work on vocabulary, math, and writing skills at their own pace.

The computer program will be expanded in the fall so that one high school in each of New York's five municipal boroughs will have a special education computer classroom. "Our first objective is to give them computer proficiency," says Rokeach, noting that some students will be able to move right into jobs after high school, while others will be better prepared for college because of their exposure to computers.

"Computers are an equalizer," says Jim Vacireca, education industry specialist for IBM and a consultant to the summer program. He adds that IBM will be able to expand job opportunities for special education students because of the computer training now available. ■

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Zaisan's Message: PC, Phone-in-One for \$2,595

Firm targets voice and data competitors, standalone electronic mail phones

BY CONNIE WINKLER

HOUSTON—The ultimate PC is really an executive telephone, says Zaisan, a hot start-up company that has just introduced a combination PC-compatible computer cum telephone, called the ES.3, for \$2,595. Well-financed Zaisan, which is just down the road from fast-track Compaq Computer, is sure to prove a strong competitor for companies such as Cygnet Technologies, Inc. and Wilcom, Inc., which offer fancy, piggyback telephones for the PC.

The "professional workstation," which takes up less desk space than a PC, apparently has everything: the PC-DOS compatible computer (its BIOS is from Phoenix Software) comes with one 5¼ inch diskette drive (a second is optional), 128K RAM (upgradable to 640K), a 9-inch screen, and a detachable keyboard made by the folks who brought you both versions of the PCjr keyboard (Advanced Input Devices). There's also a built-in



300-baud modem, with 1200 baud optional. Of course, it runs the standards such as Lotus' 1-2-3 and Microsoft's *Flight Simulator*, said Steve Fowler, Zaisan's director of marketing.

The telephone half of the ES.3 is built around what Zaisan appropriately calls a dashboard, containing the telephone keypad, 13 programmable phone keys, 8 menu-selection keys, a speakerphone, a real-time clock, a parallel printer port, and two telephone

lines. Thus, users can talk on the phone and access remote databases or run local programs at the same time. There are nice phone touches for the busy manager such as database log-on, redialing of the last 15 numbers dialed, a calendar manager and data/time reminder, and a Rolodex-like file of addresses and notes.

Inside the box, the ES.3 (the

consuming minimal power (a ni-cad battery maintains the memory); and an Intel 8088 makes it PC-compatible.

Accomplishing such concurrency was not easy, and it's what Zaisan brings to the PC party, added Fowler.

Bell Interest

Because of the ES.3's dual nature and the current confusion in the voice/data marketplace, Zaisan is also launching a three-pronged marketing effort. The ES.3 will be sold through computer retailers, by OEMs that want to incorporate the system into their product lines, and also via the telephone interconnect companies—including some of the Bell operating companies, boasts Fowler.

Fowler is one of three who in February 1983 left TI to start Zaisan. The others are Mark Fowler, Steve's brother and president, and Don Cooper, vice president of marketing. The company's initial funding came from Sirjang L. Tandon, founder and chairman of Tandon Corp., a disk manufacturer. The subsequent \$10 million in venture money came from a consortium.

Zaisan unveiled its first product, the ES.1 super telephone, at the Comdex show in November 1983 and shipped it in early 1984. Zaisan is located at 13910 Champion Forest Dr., Houston, TX 77069, (713) 580-6191. ■

NCR and ADDS Make Double Entry with PCs

NCR bundles monitor, system unit; ADDS keyboard and DOS go international

BY JAMES LANGDELL

NEW YORK—It wasn't enough for NCR Corporation, of Dayton, Ohio, to introduce its stylish Personal Computer Model 4. An NCR subsidiary, Applied Digital Data Systems Inc. (ADDS), had to get into the PC-compatible act as well by hustling out its ADDS PC/I and hard-disk PC/II, aimed at domestic and foreign markets.

The Parent's Model

The NCR Personal Computer Model 4 pays its IBM-compatible dues with an 8088 processor inside, but it owes its exterior good looks to Apple's Lisa. The 12-inch monitor, whether monochrome or color, is built into the system unit. The detached keyboard is large but amazingly light, with separate number and

cursor keypads.

The Model 4's two vertical slots for half-height drives can either hold one or two diskette drives or one diskette drive and a

10-megabyte hard disk. A typical unit—with 128K RAM, two diskette drives, a disk controller board, a monochrome (continued)



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NCR and ADDS (continued)

video controller board, and RS-232 and parallel printer ports—has three remaining full-sized slots and costs \$2,825.

Software bundled with NCR's computer includes a PC-compatible NCR-DOS with menu-driven help enhancements, GW-BASIC, *NCR Pal* and *NCR Tutor* interactive tutorials, and a RAMdisk program. (NCR Corporation, Dayton, OH 45479, (513) 445-2357.)

A Foreign Touch

ADDS, founded in 1969, is a maker of display terminals and multi-user computer systems. In addition, the company has its own network of third-party distributors, including 20 domestic and 30 international, that will market the ADDS PC/I and PC/II as "intelligent terminals" to use in ADDS installations along with forthcoming LANs and diskless PCs.

To appeal to its established markets in several European and South American countries,



The ADDS PC/I has a repertoire of six international keyboards.

ADDS is offering six optional keyboards, tailored for use in the United Kingdom and for the French, Spanish, German, Ital-

ian, and Swedish/Finnish languages.

Six international versions of MS-DOS 2.11—with translated

commands, prompts, and error messages in the chips and disk—have been promised by ADDS. However, at the company's Manhattan press conference, a boot disk labeled "Spanish DOS" instructed the ADDS PC/I to toss off most phrases, including "File not found," in fluent English. ADDS plans to provide foreign language versions of popular applications programs as well as DOS.

The monitor is built into a pedestal that turns and tilts to set a comfortable viewing position.


Manufactured by Multitech in Taiwan, the ADDS PCs are priced lower than their NCR cousins. An ADDS PC/I with 256K RAM, two diskette drives, and a monochrome monitor is \$2,650. The PC/II—with a 10-megabyte hard disk has a list price of \$4,200. (ADDS Display Products Division, 100 Marcus Boulevard, Hauppauge, NY 11788, (516) 231-5400.) ■

Calendar of Events

DATE	EVENT	COMMENT	LOCATION	CONTACT
September 27–30	Mid-Atlantic Computer Show & Software Exposition	Hardware, software, and accessories.	Convention Center Washington, DC	CompuShows P.O. Box 3315 Annapolis, MD 21403 (800) 368-2066 (301) 263-8044
October 1–4	Info 84	Hardware, software, accessories, and seminars.	New York Coliseum New York, NY	Cahners Expositions Group 999 Summer St. P.O. Box 3833 Stamford, CT 06905 (203) 964-8287
October 11–14	Computer Expo and PC Show	Exhibits, seminars, and workshops.	Cal Expo Sacramento, CA	High Tech Shows, Inc. 2020 Hurley Way, #395 Sacramento, CA 95825 (916) 924-9351
October 25–26	CAD/CAM: A Management Overview	Seminar on philosophy and benefits of an integrated system.	Holiday Inn— International Airport Minneapolis, MN	Institute for Advanced Technology 6003 Executive Blvd. Rockville, MD 20852 (800) 638-6590 (301) 468-8576
October 29– November 1	COMDEX/Europe	Hardware, software, and accessories.	RAI Congress and Exhibition Centre Amsterdam, The Netherlands	The Interface Group 300 First Ave. Needham, MA 02194 (800) 325-3330 (617) 449-6600

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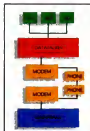
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PRODUCT REVIEW

Kick the Key Habit With a PC-Pedal

BY JAMES LANGDELL

PC-Pedal

Brown & Co., Inc.
P.O. Box 2443
South Hamilton, MA 01982
(617) 468-7464
Price: \$60 for PC-Pedal and installation software.

If idle hands are the devil's playground, the PC's keyboard has done plenty for the cause of godliness. Whenever a program requires you to hold down several keys at the same time, data entry is more like playing a button accordion than using a standard typewriter.

Now you can add fancy footwork to the total PC experience when you attach the PC-Pedal, a peripheral that lets race-car drivers, pianists, or sewing-machine operators strut their stuff while computing.

I tried the PC-Pedal and adjusted very quickly to using it in place of the Shift or Ctrl keys in *WordStar*. When I tried it in a spreadsheet, the pedal was effective for switching between using the keypad area to enter

numbers or move the cursor.

As I worked, I could instruct the pedal to control a different shift key by holding down the pedal and pressing the desired key. The tradeoff for this shifting ease is that you can't use the pedal when two shift keys must be pressed simultaneously. I think it's a small loss not to be able to rehook with your feet and a Pedal-A-Ji-Del.

A Small Step for PCs

The PC-Pedal was designed by Calvin Brown, whose previous inventions include damper controls for asphalt plants. After trying an Osborne computer, he was annoyed because his touch-typing pace was slowed when he had to move his hand out of home-row position to press the control key.

He first tried to solve the problem with hardware. The PC-Pedal's prototype was built around a photographer's squeeze bulb. Whenever he stepped on the bulb, its plunger pressed down the Osborne's control key.



When he got a more sophisticated IBM PC, Brown worked out a solution combining software with a fancier pedal. With this device, which was attached to a parallel port, he could make the pedal serve as the PC's Shift, Ctrl, or Alt key and could rapidly switch its setting between these keys.

A few of Brown's friends were intrigued by his computer's pedal, so he started manufacturing them, ran some ads, and expected a strong response from authors, secretaries, and other speed-conscious typists. To his surprise, many orders and inquiries came from handicapped PC users, whose hands couldn't simultaneously control several keys.

Don't worry about the PC-Pedal monopolizing one of your PC's precious ports. The back of

its plug is an open socket where you can plug in a parallel printer (or other peripheral) in piggy-back fashion.

Unfortunately, the PC-Pedal isn't compatible with every computer's parallel port. In our office, the installation program failed on several non-IBM machines and even one official IBM PC. It specifically won't work with the Quadram Quadboard's port. If none of your ports can harbor his pedal, Brown invites you to return it for a full refund.

Personally, I don't plan to employ my feet regularly for computing (other than to count numbers between 11 and 20), but that's no reason for me to kick the PC-Pedal. If you're looking for something that can take a load off your hands, it should do the job well. ■

PRODUCT REVIEW

ValueWare: Real Estate Can Be as Easy as 1-2-3

BY BIL. ALVERNANZ

ValueWare

David A. Brown, Inc.
P.O. Box 10395
Odessa, TX 79767
(915) 332-3209
List Price: \$250

Requires: 256K, 1-2-3 (Release 1A), two disk drives.

When it comes to investments, there are always risks, even in real estate. To help cut the risks, more and more software pro-

grams that help in analyzing those real estate investments are being introduced, but many of them take a long time to learn and are cumbersome to use.

ValueWare, from David A. Brown, Inc., takes a refreshing approach that fills a real void in the field of real estate investment programs. It comes in the form of a template or "overlay" for Lotus' 1-2-3—which cuts the learning time to a minimum and

gets right down to business. Even the manual is on disk; it can be printed out using 1-2-3's word processing function.

Simplicity is the key to ValueWare's investment analysis tools. After reviewing the 48-page manual, anyone who knows how to use 1-2-3 can analyze everything from mortgages to expected rates of return.

The age-old investment questions—"How much do I get?" and "When do I get it?"—are pretty much answered with ValueWare. The program uses state-of-the-art analysis methods along with conventional methods such as CAP rates and cash-on-cash.

All of the work is done for you with ValueWare. All you do is plug in your figures by answering a series of questions.

The speed of 1-2-3's calculations and recalculations adds to the impressive aspects of ValueWare.

ValueWare is a tool for evaluating the desirability of various investments. It is obvious that the program was put together by someone involved in real estate. Indeed, David Brown, ValueWare's designer, runs his own commercial real estate brokerage business and uses his own product in his transactions.

ValueWare stands apart from other real estate software packages for many reasons, but most significant of all is that it was developed from practical working experience. It is truly a tool that will help any investor see the strengths and weaknesses of just about any kind of real estate venture. ■

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People in the Power Stanley Kugell

Can the boy wonder who successfully started—and sold—two companies make it in the big-league PC software marketplace?

BY CHERYL GOLDBERG

CAMBRIDGE, Mass.—Sporting a safari hat and red bow tie, Stanley Kugell looks like what he is—25 years old. Certainly, he doesn't look like an entrepreneur who's started and sold two companies and is now working on his third—or a pioneer in user-friendly systems and artificial intelligence who talked his way into the Massachusetts Institute of Technology's (MIT) Artificial Intelligence (AI) laboratory, the Stanford University AI lab, and the Xerox Palo Alto Research Center (PARC). But he is.

Already, his experience has paid off. In January 1983, Kugell and Phillip Cooper, the partner of his second firm, Boston-based Computer Pictures, the business graphics software innovators, sold out to Cullinet Software, Inc., of Westwood, Massachusetts, for \$14 million. Cullinet has incorporated Computer Picture's business graphics products *Touch Track* and *Trend Spotter* into its newly released *Golden Gate* integrated software, micro-to-mainframe linking package.

Kugell is now gearing up his third firm, Javelin Software Corp., located here, with his newest partner, Robert L. Firmin, another Computer Pictures alumnus, and San Francisco venture capitalists Hambrecht and Quist. Javelin's new package for the IBM PC will change the way people think about business software, not unlike what the spreadsheet did, Kugell says.

The Businesses

In his first business venture, Buckminster Corp., in Somerville, Massachusetts, Kugell met up with David Silver, an old friend from MIT, who had been working in process control and wanted to form a business. Silver asked Kugell to be his partner.

Buckminster produced pro-



cess control equipment and software. The company's system allowed manufacturers to program and reprogram their automated equipment with software, rather than with the mechanical techniques of the time. Most important for Kugell, he soaked up as much as he could about starting a business.

High on Enthusiasm

Perhaps the key to Kugell's subsequent success is an eagerness to learn "from the ground up" and an obvious enthusiasm for doing so. In addition, his experience at Buckminster reveals a willingness to take risks and a talent for finding the right "friends" to help him reach his goals.

Kugell's second venture, Computer Pictures, began similarly. Kugell had never been particularly interested in process control, and had always been more interested in designing user-friendly software. So when Phil Cooper invited him to join in starting a computer graphics company, Kugell jumped at the chance.

Computer Picture's product, *Trend Spotter*, was one of the first graphics software packages to allow businesses to turn sales history figures into graphs, charts, and overhead projection foils. It can also do simple numerical analysis to produce trend lines and moving aver-

ages. The company's other product, *Touch Track*, permits the user to perform those functions using a touch screen. Computer Picture's clients included the John Hancock, General Electric, and Diamond Shamrock companies.

After Cullinet bought Computer Pictures, Kugell joined Firmin and started Javelin. Although the company has decided not to announce its new product until it is ready, Kugell says, "We have designed a product that uses advanced visual techniques to do forecasts and projections in a way never possible before."

Boy Wonder

Kugell's single-minded dedication to, and enthusiasm for, computers sprouted when his mother bought him a plastic mechanical binary computer, read him the manual, and taught him to program. He was 8 years old.

"Ever since then," says Kugell, "I've been fascinated with electronics and computers." In grade school, when Boston's Museum of Science installed a computer terminal for public use, Kugell befriended the librarians to gain maximum access to the computer.

At age 14, Kugell read about a thesis project, the SHRDUL program, by Terry Winograd at the MIT AI lab, that allowed a user to type commands in English to move block drawings on a screen. The user could, for example, command the computer to "pick up the big red block," and a robot arm on the screen would do just that.

Kugell appeared at the MIT AI lab and asked for a demo of Winograd's project. Soon Kugell became a de facto apprentice, absorbing as much as he could about computer science. "The fantastic thing was that I got to know people who

were making discoveries rather than using existing ones," comments Kugell.

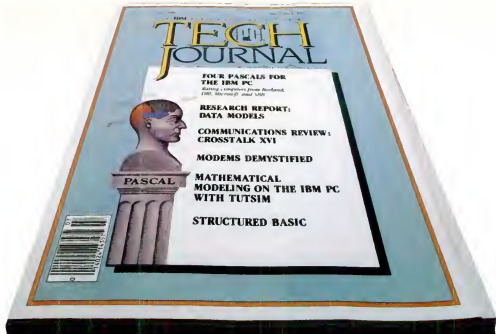
When Kugell's mentor, R. William Gosper, and other MIT researchers defected to the Stanford AI lab in 1974, Kugell ran off to Stanford. Soon after arriving, Kugell asked the head of Stanford's Computer Science Department for a job to put himself through a local private high school and, luckily, he got one. He practically lived at the lab, often sleeping in a crash pad in the basement under Stanford's main computer.

Besides soaking up as much as he could at Stanford, Kugell wrote documentation for programs in development. In addition, he wrote Dired, an interactive directory editor that allows you to edit a file directory in essentially the same way you edit a file.

When Kugell was 17, friends alerted him to the research in user-friendly systems at nearby PARC. He "instantly wanted to be there." With the help of another well-placed friend, Robert Taylor at PARC, Kugell skirted child labor laws and joined the PARC research staff.

In addition to absorbing all he could, Kugell developed a voice store and forward message system, which is essentially electronic mail using voice: a user speaks into a microphone (or a telephone) and the computer digitizes the voice. The digitized voice is then sent electronically to a receiving computer, which converts the digitized voice back into recognizable form.

In the future, Kugell plans to follow up on some of the "gems of ideas" developed by PARC researchers. "I want to translate those ideas into something a person can really use," Kugell says. "I love making the computer usable." ■



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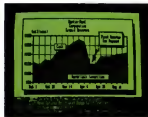
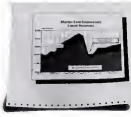


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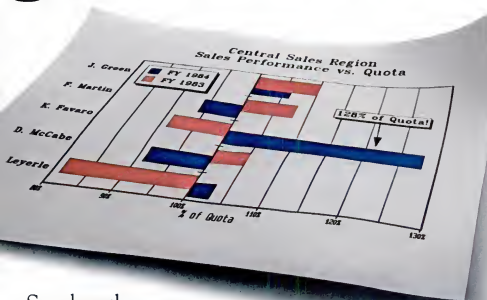
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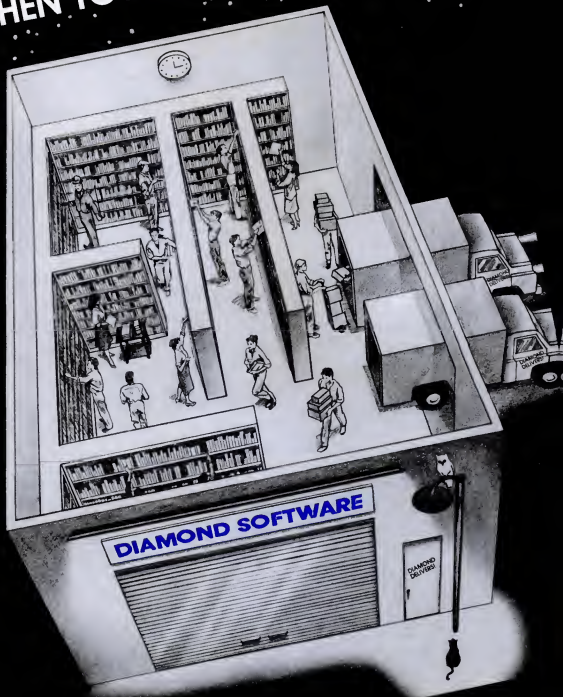
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AMERICAN ORDERS: All prices are subject to shipping, tax and currency fluctuations. Call for each pricing in Canada. **INTERNATIONAL ORDERS:** All prices given with the international delivery within the continental United States must be paid by certified check only. Includes 3% minimum \$45 shipping and handling. **EDUCATIONAL DISCOUNTS:** Additional discounts are available to qualified Educational Institutions. APO & FPO Add 3% (minimum \$8) shipping and handling. **CIRCLE 163 ON READER SERVICE CARD**

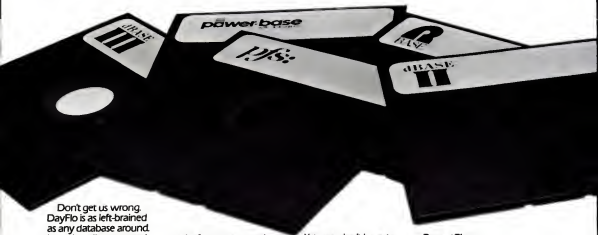
WHEN YOU'RE #1 YOU HAVE TO



DIAMOND SOFTWARE

DIAMOND DELIVERY

Traditionally, databases have been left-brained.



Don't get us wrong. DayFlo is as left-brained as any database around. It can handle structured information such as customer lists and personnel records. Keywords and field names are used to gain access to records.

Just like traditional databases.

However, solving traditional problems in traditional ways is just one side of DayFlo. It's also flexible enough to handle today's new challenges in exciting new ways.

And that's where strictly left-brained databases get left behind. **The First Free-Form Database.**

In the real world, there's always an exception to the rule.

Which wreaks havoc on traditional databases. For example, because of fixed formats, entering a new field such as a Telex number into a single customer record is next to impossible. Unless you're prepared to reprogram

and reformat your entire database.

DayFlo, on the other hand, eliminates these tedious operations. **Word-Oriented Database.**

Unlike traditional databases, DayFlo has integral word processing. For instance, you can store letters and memos along with customer lists in the same database.

Now you're free to manipulate data at will. Free to enter, retrieve, edit and shuffle information whenever and wherever you please.

Every fact you need, from key client lists to spontaneously entered notes and ideas, is just a few keystrokes away. **Power, Yes.**

Programming, No.

DayFlo is a powerful package that runs on an IBM PC with hard disk, Compaq Plus, or compatibles.

Yet, you don't have to be a programmer to use it.

So you see, DayFlo is a much greater information management tool than any traditional database. Much more flexibility and power than pfs. Much easier to use than dBASE II.

ReportFlo.

With our ReportFlo package, you can produce presentation-quality documents, reports, letters, memos and so forth from the data stored in DayFlo. This potent report writer also performs calculations.

COMPARING DAYFLO TO TRADITIONAL DATABASES

TRADITIONAL DBMS

- Fixed record format. All records must look alike.
- No word processing capabilities.
- Fixed field length.
- Adding new fields requires remapping or reformatting of database.
- One value per field.
- Retrieves data based on pre-planned criteria only.

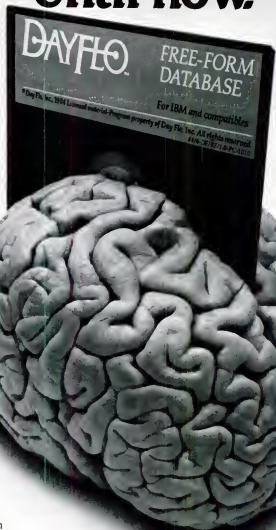
THE BENEFITS OF DAYFLO

- Free-Form record format. No two records need look alike. All record formats are stored in same database.
- Integral word processing. Create and store letters, memos, notes, ideas, etc.
- Variable field length. No counting character spaces.
- Instantly add new fields to existing records without reformatting the entire database.
- Multiple values per field. Information where you want it.
- Retrieves information based on content or key words.

WHAT YOU CAN DO WITH DAYFLO

- Client Record Tracking
- Sales Lead Tracking
- Personnel Records
- Letters, Memos, Reports
- Form Letters
- Note Taking
- Purchase Order Tracking
- Project Management
- Field Service Tracking
- And much more

Until now.



Automatic Conversion.

OK, you're sold on DayFlo. But what do you do with your present database? Convert it to DayFlo. Use our Automatic Record Conversion program for your pfs or dBASE II data.

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Visit your nearest DayFlo Dealer and see DayFlo in action for yourself. Or, if you prefer, we'll send you a Demo Disk for \$10. For details, call 1-800-7DAYFLO. In California, call 1-800-CDAYFLO.

And please ask questions. Anything your brain, either side, can conjure up.

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The Pundit Racket

Industry prognosticators claim that the enhanced PCjr will cut into PC sales and that 32-bit micros will eclipse the new AT&T and Compaq machines by 1985. And what of our humble IBM PC?

Spare us the opinions of experts. Now that IBM has introduced a warmed-over PCjr and a sizzling PC AT, experts have come out of the woodwork to analyze Don Estridge's every word. Their outpourings, in turn, are dutifully reported by the trade press and leading newspapers. For example, Estridge told the crowd at the PCjr press conference that he "didn't care whether they bought PCs or Juniors."

Industry analyst Bob Fertig told the *New York Times*, "Only a fool would buy a PC now that they've made this announcement." The article went on to say that with the new enhancements, PCjr clearly encroached on territory formerly occupied solely by the PC. Uh-huh.

Another expert had it on good authority that IBM had "cleaned up the motherboard." At the press conference, reporters asked Estridge what changes had been made inside the machine.

"None," he replied.

Ah, well. Maybe they're sending the boards to the cleaners before they go into the machine.

The original PCjr was rightly criticized for not being PC-compatible. It couldn't pass anyone's thumbnail tests: It wouldn't run Lotus' 1-2-3 or *Microsoft Flight Simulator*, nor would it accept PC expansion boards. The combined problem of a single drive and limited RAM

made it impossible to run many PC programs effectively.

IBM to the rescue. The new keyboard is fine—what a difference full-size keys and an ounce less actuation pressure



Bill Machrone

make. Then the company created a secondary power supply and a host of add-on modules, including the all-important memory card. But each module contains only 128K. Is that enough?

Granted, we're all memory hogs, but you have to look at the application. Let's say I want to run word processing and a spelling checker. The best and fastest way to run the spelling checker is from a RAMdisk. IBM's excellent *Word Proof* takes 282K for the dictionary and synonym files, which means that the Junior

needs two of the new memory modules and the power supply module to use the full capabilities of the program at RAM speed. Junior starts looking a little kludgy at this point—three modules are already hanging off Junior's side, and we haven't even discussed a printer port yet. But where do you keep the word processing program? Do you save the text files on the program disk? In RAM? What about switching back and forth between text editing and the spelling checker?

You don't have to proceed very far in this direction to discover that PCjr is still no match for the PC in most applications, no matter how loaded the Junior gets.

The PC AT

IBM's new PC AT, configured as a network server, may make PCjr more attractive as an inexpensive workstation in an all-IBM system. But it doesn't overshadow the PC's incredibly good fit as a personal productivity tool. There are many applications in which a PC AT is overkill. Don't get me wrong—I want one desperately, but that's just my barely suppressed hardware-junkie side talking. In reality, I can get my job done just as well with a PC-XT or a PC with RAMdisk. And trying to use a max-configured Junior to do the same job is an exercise in frustration.

So forgive me for questioning the in-

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PRICING MADNESS

Once again, as Federal Express picks up our ad at the very last millisecond before this issue's advertising deadline, here we sit with dozens of price reductions and new product announcements which have arrived too late for us to let you know.

Why, our ad manager asks, do we always go through a last minute price update frenzy, just seconds before our ad is due at the publisher, when we know that despite our heroic effort, many of these products will cost even less by the time you read this ad. How he asks, can we get a crystal ball to forecast what fantastic promotions and specials our suppliers are going to offer from now to the date this ad gets to the newsstand over two months from today?

Well, we decided that he has a good point. While we'll still keep getting our grey hairs and ulcers from last minute revisions, we will start publishing this notice and ask our readers to make a simple check. Look at any four back issues of this magazine (yes we're in every one) and track the prices on the most popular products. You will see that many drop with a very little ease. Most of these price changes were instituted well before the issue was printed and our members always pay the lower price. This should prove that this notice is much more than hype.

Given the current madness in the PC industry with its spur of the moment pricing and instant product introductions, you will find it always pays to call for our latest prices. You will be glad you did.

Listed below are just a few of the over 20,000 products available on our EVERYDAY LOW PRICES! All software below is priced in IBM PC format.

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dustry "experts" who would have me believe that Junior sales will take a heavy cut out of PC sales. Perhaps they would also have counseled General Motors to

make only one brand of car.

Other experts looked at the recent AT&T and Compaq announcements and pronounced the machines "uninterest-

ing" because they do only one thing: work faster for the user. Some complained that the 8086 wasn't high-tech enough, that they should have used the newer 80186 (as if the end user could tell the difference). Further, any engineer can tell you that it's much more difficult to exactly emulate the PC's hardware environment with a 186. Compatibility suffers, and engineering effort goes up. What's more important, being high-tech or getting the job done?

In the same vein, another pundit has decried the 8086-based machines because they supposedly will be supplanted by 32-bit machines by this time next year. Oh, yeah? And what processor did he have in mind? The 80386? 68020? 32032? Where is all the application software for these new chips? What operating system will they be running? Who will do the conversions?

Consider that, even though the PC has been out for nearly 3 years, virtually all of the really good software is less than a year old. You've got to have a solid, installed hardware base before you invest a couple of man-years in the latest integrated package. These things take time.

A Dangerous Game

The pundit racket can be a dangerous one. My personal batting average on second-guessing IBM is average—probably about .500. I wouldn't want to profess to you that I know all. Others are not so cautious.

One of my peers once published a drawing of the purported Peanut back when we were all wondering what IBM had up its sleeve. He professed to have an unimpeachable inside source. Two weeks later, IBM announced. PCjr bore no resemblance to the artist's conception. A month later he was back again, this time with a peevish article claiming that his information wasn't wrong—IBM just hadn't gotten around to releasing the real Peanut.

It was a fine day for computer journalism, let me tell you.

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Long Life Protection

The typical filtering device does supply some protection against surges. Most of these use a component called a metal oxide varistor (MOV). MOVs are inexpensive, and they work fine for awhile. The bad news is each time an MOV absorbs a surge, its usefulness is diminished. After awhile, MOVs are just like an expired insurance policy—they look like protection, but don't try to collect. The SB200 uses an avalanche diode for fast reaction to small surges,

(just .1 nanoseconds) and a gas discharge tube for longer surges at higher voltages. Unlike varistors, these two devices do not lose effectiveness with use, and can shield your computer from up to 1,000,000 watts of power!

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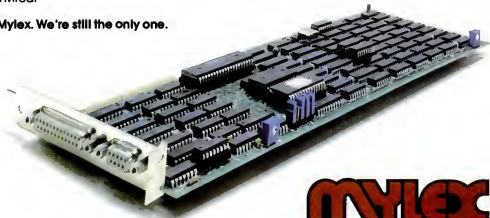
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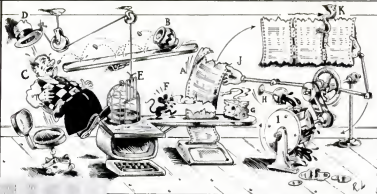
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Lighting the Fuse

The much-vaunted information age won't explode unless on-line systems make themselves more accessible to the masses. Standards and a trade association are possible solutions.

The recent advances of on-line systems rank as the most important development in information dissemination since the invention of the library. Tremendous amounts of timely information can now be quickly disseminated at low cost. However, before these on-line systems can become a useful part of everyday life, a number of problems have to be overcome.

Each of the hundreds of information services now available currently uses a different and usually arcane language, causing a natural reluctance in users to learn any of them. If, on the other hand, there were a simple, consistent user interface, both adults and children could learn to use on-line systems with the same ease as libraries and telephones.

Standards Needed

All information services should unite to form a trade association and define a common model. To get the ball rolling, I suggest a CompuServe-like system that uses pages of information arranged in a book, complete with index pages and cross-references. On-line systems must abandon deep layers of menus where the only way out is the power switch.

The trade association should also determine a standard transmission protocol so the user needn't set start bits, stop bits, parity, byte length, and so on just to find

out what's on at the movies.

Eventually, you should be able to access electronically retrieved information in electronic form in your computer and also be able to process it in some way.



John Page

Examples include the following:

- Writing a term paper, you need a quote from Shakespeare. Think of how nice it would be to dial the library and use your word processor to merge the quote into your paper.
- Watching the stock market, you need current stock prices. It would be convenient to be able to load them into your spreadsheet for analysis and graphing.
- You wish to mail an ad to a select group of potential customers.

Wouldn't it be nice to be able to search a large, central database and load the resulting mailing list into your personal computer system, in order to print address labels and customized cover letters?

The reason you can't carry out all these procedures right now is that the data arriving over the phone are intended only to be displayed on a screen and read by you. Except for special cases, no software program in your personal computer can be written that can use this data. Unfortunately, the sad part about the examples used above is that the data required to accomplish all of them are available today from a number of services.

Accepting Reality

Information vendors must accept that the recipients of most of their data will be computer programs, not people. They must provide two ways to view the information—one for a human user and the other for PC software. Of course, the software interface must be generic and standard. If this were done, the much-vaunted information age would be a great deal closer. ■

John Page, vice-president of corporate research and development at Software Publishing Corporation, has 14 years of experience in computer systems.

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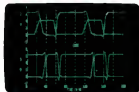
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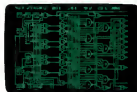


Typical MICROCAP Transient Analysis

works. In addition, you get even more advanced device models, worst case capabilities, temperature stepping, Fourier analysis, and macro capability.

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Letters to PC

IBM on the 3270 PC

There are a number of points in Bill Harts' article "The Elusive 3270 PC Connection" (*PC*, Volume 3 Number 13) that I feel need to be addressed.

The 3270 PC is not just an expanded version of the PC-XT, and this fact seems to have disappointed Harts. Specifically, your readers might be interested in a few clarifications I'd like to make.

The "PS card," erroneously referred to as a "Presentation Space card" in the article, is actually a "Programmed Symbols" card. This card is used when displaying host graphics on one of the four possible 3270 sessions.

The discrepancy between the file sizes observed during upload and subsequent download is because the file transfer was most likely performed with fixed-length records. Excess space at the end of the last record is padded with blanks and treated as data by the DOS file creation, but it is not treated as data by the application. The net result is that the transmitted files may consume slightly more space than required by the actual data. This space consumption can be avoided by transferring variable-length records through the use of the RECFM parameter on the SEND command as described in the documentation.

The reason that 3279 GDDM PS graphics cannot be printed locally on the IBM matrix printer is because the 3279 graphics are in the form of programmed symbols that are not supported by the printer. In contrast, APA graphics, in the form of picture elements, are printable on the local matrix printer.

The ability of *dBASE II*, 1-2-3, and most PC programs to perform distributed database functions, such as the ones described in the article, does not depend on the 3270 PC. These programs were

simply not designed with that concept in mind. We and software vendors are working to address this requirement.

M.J. Maples
IBM Corporation
Kingston, New York

I have just finished reading "The Elusive 3270 PC Connection." Bill Harts' article



is a classic example of comparing apples to oranges and then finding fault with the apple because it is not a citrus fruit. Personal computer magazines such as yours constantly review products based on what you hope they can do instead of what the product was designed to do.

The fact that the 3270 PC cannot directly read a 1-2-3 spreadsheet from the host is a limitation of the VTAM network and the host operating system. The fact that the 3270 PC can have only one PC-DOS session is a limitation of PC-DOS. Why did Harts prattle on about his dream list of micro-mainframe connection capabilities when he was supposed to be reviewing a new hardware offering from IBM? If Harts wished to "maintain [his] *dBASE II* data file on the host and an index file on the micro," then perhaps he should contact IBM and request that the IBM mainframe operating systems be modified to support IBM PC-DOS in a distributed processing environment.

The 3270 PC is an addition to the 327X

family of terminals from IBM for use on the 3270 network. The 3270 PC was not meant to replace the 3278 terminal or the IBM PC running 3270 emulation. The capabilities of the 3270 PC make it an excellent 3270 workstation for certain situations.

John Singer
Fenton, Missouri

Bill Harts replies:

Since I wrote the article, IBM has made significant improvements to the 3270 PC (see "IBM Brightens 3270 PC with Graphics Capabilities," PC, Volume 3 Number 16, page 35) that address some of the problems that the machine had.

A machine's shortcomings are certainly as much a part of a good computer review as are its strong points. If a reviewer wrote about an automobile without mentioning that it came without wheels, he might be looked upon very strangely indeed! We all recognize the contributions of IBM to this industry, but IBM is certainly not infallible.

Keen on QNX

For over a year I've harbored a theory about why none of the mainstream IBM PC computer magazines paid much attention to QNX. My bet was that it was all a nefarious plot; the editors and writers themselves used QNX but were trying to keep it from users simply so magazines like *PC* could keep ahead of their workload. My experience has been that QNX, with its multitasking and windowing capabilities, superb full-screen editor, real-time speller, and documenter, vastly enhances productivity compared to products available under PC-DOS.

The review by Kaare Christian ("Taking the Cue from UNIX," *PC*, Volume 3 Number 10) disproved this hypothesis,

LETTERS TO PC

however, revealing that PC was simply ignorant. For example, QNX was described as a "new" multitasking system. New? I've been using it since December 1982, although admittedly the windows were unavailable until last summer. QNX predates PC-DOS 2.0, answering Christian's disapproving question about why QNX doesn't share the same hierarchical file structure: QNX was around and functional long before DOS 2.0.

Christian's review hardly does QNX justice. I began using QNX because I had been weaned on Berkeley UNIX and needed something approaching its func-

environment that permits many PC-DOS programs to run, including recent versions of dBASE II, KnowledgeMan, and Multi-Mate.

Christian does identify one hole in QNX's armor: there is no way to check the logical structure of the file system and to recover orphaned directories. It's not too hard to write the needed utilities yourself, given QNX's valuable library of utilities and the C compiler, but one shouldn't have to do so.

Quantum Software has been very responsive to me as an end user. They also run an update bulletin board that permits downloading the most recent versions of various products for free.

PC users who need a functional multitasking system with background tasks, windows, password protection, and more should give QNX serious study.

J.P. Meyers
Philadelphia, Pennsylvania

Kaare Christian replies:

My theory about why QNX receives little attention in the mainstream computer magazine market is because it is not a mainstream product. However, it is certainly a good product and I think highly of it.

If you are building robots or telescopes, or if you are controlling laboratory or industrial equipment, I highly recommend QNX. However, it is not the best vehicle for running mainstream PC-DOS software—that distinction is left to DOS. Similarly, QNX is not the best way to bring the UNIX productivity tools to a PC. If you want the fullest set of Berkeley tools on a PC, try XENIX. If you want a responsive, yet full UNIX implementation, try VENIX. If you want to write your own real-time software, then QNX is by far the best. Technically, QNX is fine, but its market niche is small.

I think QNX should support the DOS 2.0 file structure even if QNX came first. I agree that QNX's QDOC text-formatting program is versatile. Unfortunately, it contains only a fraction of the power of the UNIX tools nroff, troff, tbl,

eqn, refer, awk, style, and diction. I agree with Meyers that the QNX documentation is good and that Quantum's update policy is admirable.

Getting Set for 2.1

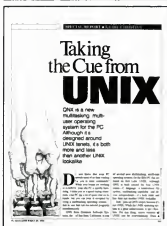
I read Gregg Weissman's two-part article on modifying COMMAND.COM to use the SET command for abbreviated file specifications ("Enhancing PC-DOS," PC, Volume 3 Number 14, and "Get SET for Speed," PC, Volume 3 Number 15). He presented a very powerful and useful tool. Unfortunately, I'm running DOS 2.1 and lack the sophistication to analyze the COMMAND program in sufficient detail to modify Weissman's DEBUG instructions. Could we have a short update for DOS 2.1 users? I think all we need is the right addresses for the later version, or is there something else?

Edward J. Green
Washington, D.C.

Thank you so much for Gregg Weissman's article "Get SET for Speed." His suggestions were wonderful improvements for DOS 2.0. Now, can anyone give us the modifications to do them with DOS 2.1?

I have a procedure that can take a lot of pain out of doing DEBUG modifications like the ones Weissman describes. His modifications involved a lot of typing, which can be discouraging if you go all the way through the program only to find that it doesn't work because of a typing error. In such a case you are faced with the unhappy prospect of doing it all over again.

But if you enter all of the input lines into a file with EDLIN (or your favorite editor), then you can proofread them to make sure they are correct before using them. This entering is simple to do. Suppose that you entered all your input for Figure 1 in a file named FIGURE1.INP. Then if you want to use DEBUG to expand COMMAND.COM, all you do is enter the following line at the DOS prompt:



tionality on a micro. QNX was ready and waiting when I needed it. The full-screen editor is fast and powerful and provides excellent macro facilities that allow both predefined macros as well as temporary macros defined by keystroke sequences to run. I wouldn't dream of using WordStar anymore. The text formatter, QDOC (which is much like nroff from UNIX in style) is also versatile. It, too, offers very powerful macro writing facilities that can produce highly customized output, including automatic indexing, tables of contents, and so forth. Documentation for this formatter, and for QNX as a whole, is excellent. QDOS provides a PC-DOS operating

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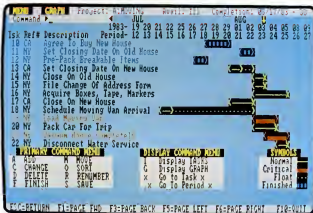
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DEBUG COMMAND.COM <FIGURE1.INP

(The < symbol is the DOS redirection operator.) If you have included everything and have not forgotten to leave blank lines for each of the lines with the Enter key, it will zip into and out of DEBUG so fast it will make your head spin. And, if an error should crop up, just make the changes in the input file rather than go through the entire procedure again.

Bob Stephan
Pebble Beach, California

Gregg Weissman replies:

At the time the article was written, DOS 2.1 didn't exist. However, I have provided PC with a listing valid for Version 2.1. If anyone would like a printed listing of the modification, send a self-addressed, stamped envelope to 2.1 Environment Code, PC Magazine, One Park Ave., New York, NY 10016.

Also, this warning was left out of the original article: Once you make this modification, DOS will not always be able to tell if the transient portion of COMMAND.COM has been overwritten by an application. If just part of the added subroutine is wiped out and nothing else, COMMAND is not reloaded, and your system can hang. Most applications will not cause this problem, since they overwrite enough of COMMAND to force the reloading process. The only time I have experienced a problem is with Microsoft's Word when loading the program and then immediately quitting it without entering any text. It seems that Word stores a little bit of junk right where I put the new subroutine. However, if you type a few lines of text in, other parts of COMMAND.COM get written over. When the program exits, DOS reloads the overwritten file.

Norton Responds to Mail

Peter Norton implies that mail-order houses buy their software from the same distributors as retailers and that overhead is the factor that makes mail-order prices

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low ("Make Sure the Price Is Right," PC, Volume 3 Number 12).

Using Norton's percentages, a discounter would pay \$420 for a program like *dBASE II*, which retails for \$700, then sell the program for around \$525. Well, if you check the discount ads, you'll see that *dBASE II* is generally listed for \$370 to \$400. Are the mail-order houses taking a loss? No, but they sure aren't buying from a distributor.

Typical costs at a mail-order house differ from Norton's description of them.

Mail-order prices are low primarily because most of the software these companies sell comes from the program manufacturers, not from distributors. A high-volume mail-order house can buy distributor quantities from a manufacturer at corresponding discounts. Add to this the low overhead Norton mentions, and you can see why mail-order prices on some products are actually lower than what distributors charge retailers.

Software that doesn't sell in huge quantities, on the other hand, might come from a distributor at less of a discount than products ordered directly from the manufacturer. And, of course, discount levels offered by manufacturers vary quite a lot in the first place. Different mail-order companies also have different sales volumes, so that some always have a good stock of deeply discounted software bought from manufacturers, while other companies can support only a small inventory bought in retailer quantities from distributors.

On top of all this, discounters offer varying amounts of customer support or take out larger or smaller ads in computer magazines, or differ in the amount of overhead they have to cover. All in all, typical costs and overhead at a mail-order



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house differ considerably from Norton's description of them.

This discussion is important if one of your programs becomes well known. Bear in mind that you'll probably be able to increase your sales volume by offering the same incentives to reputable mail-order dealers as you offer to distributors.

Genevieve Engel
Berkeley, California

Peter Norton replies:

Engel is quite right; she covered some important points that I overlooked. One further item to note is that the wholesalers increase their discount as a retailer's volume goes up. That, and the benefit of one-stop shopping through a good wholesaler, can often make buying through a wholesaler more attractive than buying from many separate software manufacturers. Regular retailers, mail-order discount retailers, wholesalers, and software producers all have an honest role in providing software to the PC community.

Corrections:

There has been a price change on *Threshold*, one of the medical office management programs reviewed in "Office Medicine" (PC, Volume 3 Number 18). The new, lower price is \$3,900.

The manufacturer of *Enable* ("Are Good Looks Enough Today?" PC, Volume 3 Number 16, page 33) is The Software Group, Northway Ten Executive Park, Ballston Lake, NY 12019, (518) 877-8600.

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Wake Up to Menuing Systems

A menuing system takes application programs, DOS commands, and other computer functions, wraps them up in a tidy package, and turns them into easy-to-use menu options.

In Hollywood, they call it a "sleeper"—an unassuming production that no one expects much action from, until suddenly it wakes up and becomes a big hit.

The same goes for software. There are a handful of gems—really good software ideas—that go unnoticed. They are the sleepers of the software world. I'm going to tell you about one software idea that we ought to wake up to. Corporate America, here's something you need.

What I'm talking about is menuing systems, such as IBM's *Fixed Disk Organizer* (FDO), a software sleeper.

Have you heard of the *Fixed Disk Organizer*? Few have. It was mentioned earlier in this column, when I talked about the general topic of shells. (See "Shells: A New Face for DOS?" PC, Volume 3 Number 10.)

I found the *Fixed Disk Organizer* buried, of all places, in the list of software that was released with the PCjr. Why announce it together with dozens of Junior programs? Not only is this software inappropriate for the Junior, but its name makes it clear that *Fixed Disk Organizer* was created for the XT. It almost seems as if IBM wanted this program to go unnoticed. Whatever the company's intent, the *Fixed Disk Organizer* has snoozed quietly.

Part of the reason that this product is a

sleeper is its terrible name. Besides being long and clumsy, it doesn't give you much of an idea of what the program is about.

You might be thinking that menuing



Peter Norton

systems are only for systems with hard disks, the XT class of machines. Not true, despite what the name *Fixed Disk Organizer* implies. Menuing systems, like subdirectories, make the most sense when you have a hard disk, but they can be useful with floppy-based systems as well. In fact, I see good use for such a system with a floppy-based PC much more than I see use for subdirectories. But, in truth, they make the most sense when you've got all your programs on a hard disk.

At Your Fingertips

FDO is a menuing system. Menuing systems put application programs, DOS functions, and everything else that you customarily do with your PC at your fingertips. Instead of typing in commands to DOS to run a program or batch file, you select the things you want to do from a menu of options. The options might be application programs—word processing or whatever—or they might be other submenus that let you choose from other selections, topic by topic. Needless to say, selecting items from a menu is easier and much less error-prone than typing in DOS commands.

Menuing systems are designed to solve a serious problem that faces organizations using PCs, especially large corporations that buy the machines in bulk.

In the early days of the PC, most of the people using them were technically sharp enough to deal with the annoying computerese that was involved in getting useful work out of a PC. But more and more, untutored workers are using these machines without having the know-how to tinker with them.

A menuing system wraps those things up into a tidy package and presents you with a selection of things to do, each with a name that means something to you. You select a menu item, and off you go.

Menuing systems are a good solution



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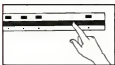
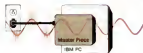
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for any office or organization that has more people using PCs than people who understand them. The idea is simple: the folks who understand the computer set up a menu selection of the tools and tasks that the nonexperts use. Then the nonexperts are relieved of lots of technical nonsense.

IBM's *Fixed Disk Organizer* is the first such system I ran across, but it's not the only one. As I was preparing to write this column about *FDO*, a competing product, called *Direct Access*, appeared in the mail, unsolicited.

Menu to Menu

I played with both these systems, *FDO* and *Direct Access*, and found lots of similarities and a few differences.

The main difference is that *Direct Access* is slightly easier to learn and use and a bit cheaper, while *FDO* includes a few more features, including password protection that allows you to make parts of the menu off-limits to intruders. (By the way, *FDO*'s password mechanism applies only within the context of the menu—it's not a real security system.)

Both systems work in roughly the same manner. In operation, they present the user with a selection of menus, submenus, and items that can be selected with a single keystroke. When you select a working item, the menu system executes the appropriate item and then returns to the menu system when you're done.

For both systems this is done through the use of batch files. The menu system creates and modifies batch files dynamically. These batch files are used to pass control of the computer from the menu system to whatever application you choose and then pass it back to the menu system for the next choice.

Both these systems are quite easy to use once they're set up, and setting them up isn't difficult. I did discover, in both cases, that I had to do a little detective work to learn the batch file tricks in order to make the system function.

Once I set up and understood the systems reasonably well, it was a breeze to use them and to change them (fine-tuning the menus, adding items, and the like). For simplicity and no-fuss use, both *FDO* and *Direct Access* get good marks from me.

Not for Everyone

Based on my experience, I'd say that menuing systems, such as *FDO* and *Direct Access*, would be extremely useful

Menuing systems are a good solution for any organization that has more people using PCs than people who understand them.

in any organization that had at least one "local expert" to set things up for the nonexperts. And once they are set up, it doesn't require special expertise to use them successfully.

My feeling about both systems is that they aren't really for individuals to use. If you have enough savvy to be able to set either of them up, you probably won't benefit from the simplicity that they bring to the use of the computer. And both *FDO* and *Direct Access* probably aren't sophisticated enough to satisfy an advanced PC user. Though I wouldn't want to rule out the possibility that you might set up either system for your own use, they are really best for organizations. The larger the organization, the more people using PCs, and the less expert the users, the greater the benefit of a menu system. When properly used, a menuing system can provide a comfortably uniform way for the people in your organization to work with PCs, regardless of their skill level.

Snooping Around

By the way, one of the first things that I do when I get new programs, such as *FDO* and *Direct Access*, is snoop around inside them to see what I can find. You'd be amazed at the interesting and occasionally useful things you can discover. You can do it yourself by using DOS' DEBUG tool, DiskLook (part of my *Norton Utilities*), or other snooping programs.

When I went exploring inside *FDO* and *Direct Access*, I found all sorts of things. The interesting and curious part was a list of the associates and collaborators of *FDO*'s author, including a salute to his lifelong friend (and wife, I guess), Heidi. A more useful bit of information is that both these systems are written in compiled BASIC.

It's not often that you come upon software with a serious purpose, particularly operating systems-type software, such as these menu shells, written in BASIC. To find it here is something of a surprise.

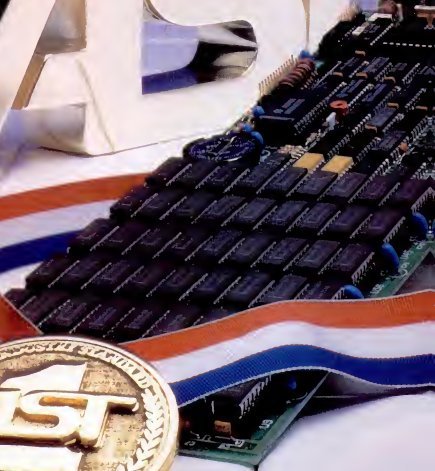
Discovering that these programs are written in compiled BASIC explains why both of them are rather slow performers and bulky as well (*FDO* is 74K; *Direct Access* amounts to about the same, in two programs of 33K and 45K).

The size and slow performance of both menu systems is only a small drawback and not something that I would classify as a significant problem. But, on the other hand, it does present an opportunity for another system to outperform and outclass them.

Where to Find 'em

You can find IBM's *Fixed Disk Organizer* through the usual outlets for IBM software; it's priced at \$60. You can get Jim Anthony's *Direct Access* through his Delta Technologies, P.O. Box 1104, Eau Claire, WI 54702, (714) 832-0958. It's also carried, I understand, by a few dozen stores, and it's priced at \$45. And you can find other menuing systems by cruising the ads in *PC Magazine*. ■

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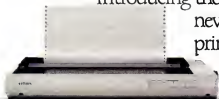


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COVER STORY • JOHN HELLIWELL

ON-LINE WITH SMART MODEMS &

While dumb terminals can access on-line



For your PC to communicate with any other computer, you need two things: a modem and communications software for your PC. The basic function of a modem is to translate the ones and zeros inside your computer into signals that can be transmitted via telephone. The communications software controls the whole process inside your PC.

There is such a wide variety of modems and communications software that making a choice can prove difficult. If you know that you will be using them primarily for on-line access to databases and other big-

SOFTWARE

services, a more intelligent option exists.



computer, pay-by-the-minute services, however, you'll have a clearer idea of what features to look for.

Higher Speed, Higher Bills
The two fundamental choices you have when shopping for a modem are speed and packaging design.

Two speeds are commonly available in microcomputer modems today, 300 bps (bits per second) and 1,200 bps. If you're moving text, this translates into roughly 30 characters per second and 120 characters per second respectively.

Modems of 300 bps and 1,200 bps are frequently referred to as "300 baud"

(which is correct), and "1200 baud" (which isn't). Baud is one measure of the speed of a modem, and bits per second is another. They coincide when the 300-bps encoding scheme (called frequency shift keying) is used, but not under the 1,200-bps scheme. A 1,200-bps modem (212 standard) actually communicates at 600 baud (known as four-phase differential shift keying).

The higher speed is a big advantage if you plan to process large quantities of information, but you pay a price: a 1,200-bps modem costs roughly four times as much as a 300-bps modem.

The cost of 1,200 bps may exceed the one-time purchase expense: some database services charge more money per minute when communicating at 1,200 bps than at 300 bps. Contemplating your next move could be much less expensive at the on-line service's 300-bps rate than at the 1,200-bps rate. Extra charges for 1,200-bps service aren't widespread—but neither are 1,200-bps modems. As fast modems proliferate, however, on-line services might feel compelled to hike their rates, unless, of course, the market grows so much that prices remain stable or drop.

If you're only retrieving small bits of information, you probably don't need 1,200 bps. On the other hand, if you intend to retrieve huge volumes of data, it will probably be much less expensive to let the on-line company print out your results on high-speed printers for mail delivery to you (a service called "off-line printing") than to retrieve everything over the phone lines at 1,200 bps. Of course, the requests and commands you type to the

on-line service won't move at anywhere near the 30-characters-per-second rate, much less 120.

The expense of a 1,200-bps modem will only be worthwhile if your expected usage falls into that (admittedly large) middle range of situations and involves far more data inflow from than outflow to the on-line service. To calculate how much you'll save (or not save) if you buy a 1,200-bps modem, first figure out the difference in cost between a 300-bps modem and a 1,200-bps-modem. Divide that figure by the per-hour cost of the on-line services you're most likely to be using to find out how many hours of connect time you have to save to make your purchase worthwhile. Even though 1,200 bps is numerically four times greater than 300 bps, you'll actually cut your connect time by only about half because of the time you'll fritter away thinking and typing. How many weeks will it take you to do that many hours' worth of on-line work? Is the 1,200-bps premium worth it?

Finding the Right Modem

There are two types of 1,200-bps modems. One is known as a "Bell 212 standard" modem (which is the kind you want), and the other is known as a "Bell 202" modem (which you don't want). Almost all microcomputer modems on the market today are 212 modems.

A 1,200-bps modem is not simply an accelerated 300-bps modem; it uses a completely different method of translating computer signals into phone signals. Conversely, a 1,200-bps modem can't simply be slowed down to run at 300 bps. Most 1,200-bps modems can also run at 300



Illustration: Mark Penobscot

**A 1,200-BPS MODEM IS NOT A SPEEDIER
300-BPS MODEM; IT USES A DIFFERENT
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SLOWED DOWN TO RUN AT 300 BPS.**

hps, because they have separate sets of 1,200- and 300-bps circuits. Don't assume that by buying a 1,200-bps unit, however, that you can communicate with services or friends who can only operate at 300 bps.

Modems come in three forms: as a board that fits inside your PC, as a free-standing box that plugs into both your PC and the telephone system, and as an add-on to a voice telephone.

If you do not now have a serial (alias RS-232C, alias asynchronous) connecting port on your computer, a board modem is probably the least expensive way to go. It's a circuit board that fits into one of your PC's expansion slots. It usually includes a length of telephone cable with ordinary male telephone minijacks at either end. Once you have installed the board in your computer, you plug one end of the cable into a socket at the back of the computer, the other end into a wall jack, and voilà. You are ready to communicate.

Separate but Equal?

If you already have a serial port (either in the form of an IBM Asynchronous Communications card or as one feature of a multifunction card), the cost of a connecting free-standing modem will be a little less than the cost of a board modem. Apart from cost, there are several other reasons why you might prefer a free-standing unit: the modem can be easily shared with fellow computer users; the modem doesn't require an expansion slot all to itself; indicator lights, which are especially useful for beginners, show the status of your communication (these lights are impossible on board modems); and, lastly, if you own a PC-compatible machine, it

may be difficult to find a board modem that fits your computer.

Free-standing modems, although usually compact, take up space. Partly to eliminate this space requirement, but also as a means of introducing new functions, a couple of companies have built the modem into a telephone. This doesn't mean, however, that data communications and a telephone call can go on simultaneously over one line. The difference between this modem and others is more in packaging than technology. One disadvantage of the phone/modem combination is that a relatively heavy cable must connect the computer to the phone/modem, which may limit the flexibility of your office arrangement.

Any modem can translate the signals inside your computer into signals that can be carried on the telephone network. But many modems are much smarter than that, offering a number of other features.

A common and very useful "smart" feature is auto-dial. Without auto-dial, you have to manually dial the telephone number of the distant computer or network. When the other party answers, you must press a button to tell the modem to take over the call. In contrast, an auto-dial modem can accept a dialing instruction code and telephone number from the computer and "dial" the number (that is, emit the tones or clicks that your phone line requires) that connects you to the distant computer. This feature is very convenient, especially if your software has sophisticated auto-dial support. (For more on auto-dial software, see below.)

Auto-answer, the modem's ability to detect an incoming call and respond to it, is of little use in on-line work; it is only

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CIRCLE 753 ON READER SERVICE CARD

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CIRCLE 752 ON READER SERVICE CARD

This line includes, among other modems, 300-bps and 1,200-bps free-standing and board units for the PC. The Hayes Smart-modem line offers many features in addition to auto-dial and auto-answer. But, unless you're designing your own software or a sophisticated message-exchange system, you'll never make direct use of these smart features. However, your communications software might.

It's important to buy the software and hardware together and to be sure that the software you choose makes use of hardware features you are interested in. Often, this means purchasing a common modem or one that is compatible with a common modem, such as the Hayes line.

Many smaller modem manufacturers, unsure whether the software producers would tailor software to their products, have produced modems that respond to the same codes as the Hayes. Hayes-compatible modems usually offer some combination of lower price and more features than Hayes itself. But fancy features are useless if your software can't take advantage of them.

Although a modem is essential, your communications software is the most important factor determining the degree of convenience and power your communicating system has.

The fundamental role of communications software is to take the characters represented by your PC's keystrokes and route them out through the serial port of your computer, and to receive the characters coming in through the serial port and display them on your computer's screen.

To do even this simple job successfully, your computer and modem, and the computer and modem at the other end of

the communications circuit, must agree on a number of features ("parameters") of the exchange. Because with on-line and other remote services you have no control over the other computer, you must be able to set your features to match the distant computer.

Speed is the easiest parameter to understand: your computer (controlled by the software) and modem, and the distant computer and modem, must all agree to communicate at either 300 bps or 1,200 bps. If your modem is capable of both 300-bps and 1,200-bps communication, it will usually be able to automatically match the speed of the distant computer's modem. However, your software must offer both speeds, so it can control the speed at which your computer

sends information out through the serial port to the modem. (Your serial port, whether it's on an IBM asynchronous communications board or on a third-party multifunction board, is probably capable of speeds up to 9,600 bps, much faster than today's modems.)

Three communications software parameters relate to the way the two computers package the characters they exchange: data bits, stop bits, and parity. It's less important to understand these parameters than to simply set them to agree with the remote service. The manuals that come from any remote service will tell you what settings to use.

Repeating Mistakes

The last of the universally used settings is called "duplex," or more properly "echo." When you type a character on your keyboard, it is sent out through the serial port and modem to the distant computer. Frequently, as an error-checking measure, the distant computer will instantly return the character over the phone lines. As a result, the character you see on your screen has actually made a round trip to the remote computer and back. (The character should be the same one you typed unless an error was made in transmission.) A computer that echoes everything back is said to be operating in "full duplex" mode (Figure 1a).

The alternative to remote echoing is for the distant computer to swallow what it gets and for your computer to display what you type directly on your screen. In contrast to "full duplex," this is frequently called "half duplex" (Figure 1b).

Of course, both your computer and the



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ONE COMMUNICATIONS PROGRAM TO
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IMPORTANT DEPEND ON THE NATURE OF
YOUR COMMUNICATIONS.

distant computer must agree; otherwise, you'll either get two of every character on your screen (one echoed by each end) or nothing at all.

The manual for any remote service will tell you which setting to use. Your communications software may use the terms "local echo on" (for half duplex) or "local echo off" (for full duplex). In fact, the term "duplex" more properly refers to another feature of communications altogether, but it has become so common that even purists use it.

Smart Software

A communications program that allows you only to set these parameters—speed, parity, data word, stop bit, and echo—and nothing more, is called a dumb terminal program. But your PC is more than a dumb terminal: it has memory, disks for storage, a powerful processor, and probably a printer. If it's equipped with a sophisticated communications software package, it can act like a very smart terminal indeed.

The repertoire of smart features varies from one communications program to another, and what features are important depends on the nature of your communications. The following description concentrates on those features of interest to users of on-line services.

There are at least 20 general-purpose communications programs available for the PC, and many more than that have been written to facilitate access to particular on-line services. The best general-purpose software will make access to any service convenient and easy. A general-purpose program is your best choice if you

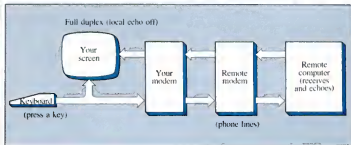


Figure 1a: The process by which characters appear on your screen under a full duplex system (local echo off).

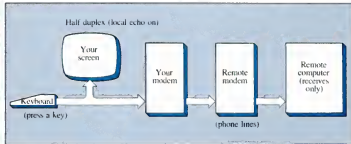


Figure 1b: The process by which characters appear on your screen under a half duplex system (local echo on).

intend to explore the electronic universe. If, however, you intend to restrict your explorations to a single on-line service, ask representatives if there is communications software specifically tailored to that service.

This quick survey examines three different packages of increasing power (and price). It illustrates what features are important over and above the unavoidable settings previously described.

One of the most popular and inexpensive packages for the PC is *PC-TALK III*,

produced and distributed by The Headlands Press, Inc. (If you get it from a friend, the company requests that you send \$35 to the originators and encourages you to pass the program on to a friend.)

For its price, *PC-TALK III* offers many features. The smart feature it does best is to support auto-dialing of telephone numbers. *PC-TALK III* lets you build a directory of telephone numbers. With each number, you can store the setting for each of the parameters described earlier. Choosing a particular entry in your direc-

tory causes *PC-TALK III* to dial the number and to set the appropriate parameters automatically. Consequently, once you've looked them up and entered the settings in your dialing directory, you can forget about them.

PC-TALK III also permits "downloading" and "uploading". Downloading refers to recording a communications session on disk—the commands you typed in and responses from the on-line service. Downloading support, a common feature of smart communications programs, may also be referred to as "capturing" or "logging" a session. The data recorded on disk can be later printed, or edited using word processing software.

Uploading, the reverse of downloading, refers to sending a file from your disk to the on-line service. In on-line work, this feature is only useful if you have access to an electronic mail facility. In this way you can prepare your messages before you sign on using your word processing software, connect to an on-line service, get into the electronic mail function, and then

transmit (much more quickly than you could type) the message.

Besides capturing your session on disk, *PC-TALK III* lets you print it on your printer as it is being sent over the phone lines. The printer can be turned on and off as often as desired during the communications session.

PC-TALK III offers a simple macro facility. This facility typically refers to a string of characters that is frequently used (an account number, for example) and can be stored in a communications program and sent to an on-line service by striking only one or two keys. *PC-TALK III* lets you assign strings of up to 126 characters to each of your PC's ten function keys, plus the Alt-, Ctrl-, and Shift-function key combinations—a total of 40 macros. Another important, money-saving use for macros is the preparation of a search strategy (or other set of commands) before signing on to a many-dollars-per-hour database service. Loading your search commands into a macro avoids the time involved in typing them in and lets you think through your strategy before you go on-line and start running up the meter.

PC-TALK III implements a feature that is essential in on-line work: the Break key. The Break key, when hit, sends a signal to the on-line service to break from whatever it is doing and wait for further instructions from you. Different communications programs assign different keys on PC's keyboard to this function, but the function is the same.

PC-TALK III also implements the XMODEM data-file interchange protocol, which is of no use for on-line work but which is important if you want to use the same program for exchange of program or



data files with other microcomputers.

Ready for Hook-Up

PFS: ACCESS, by Software Publishing Corporation, is a more sophisticated program designed specifically for accessing on-line services. Consequently, it offers downloading, uploading, printer support, and a Break key; it does not offer the XMODEM protocol. It costs about \$100.

PFS:ACCESS automates the process of signing on to on-line services. Its main menu offers a choice of up to eight different services, each with a telephone number, an appropriate set of parameter settings, and a "script" for the sign-on.

The program comes already set up to connect to The Source, CompuServe Information Services, Dow Jones News/Retrieval Service, and EasyLink and MCI Mail electronic mail services. All you have to do is supply the correct local telephone numbers for these services. You can add other services to the menu if you subscribe to them, and you can delete or replace the predefined services if you do



BESIDES CAPTURING YOUR SESSION ON DISK, PC-TALK III LETS YOU PRINT IT AS IT IS BEING SENT OVER THE PHONE LINES. THE PRINTER CAN EVEN BE TURNED ON AND OFF DURING THE COMMUNICATIONS SESSION.

not intend to use them.

The sign-on script is created, in effect, by telling *PFS:ACCESS* to pay attention while you sign on manually; the program records the steps, including what prompts come in from the service and what your responses are. Once recorded, the script will be automatically repeated every time that service is chosen from the menu.

Besides printing, downloading, and uploading features, *PFS:ACCESS* also allows you to review an in-progress communications session simply by using the PgUp, PgDn, and arrow keys to move backward and forward.

Because of its ability to memorize scripts, the package's vendor apparently believes that *PFS:ACCESS* doesn't need a macro facility like that in *PC-TALK III*—and indeed, for automating sign-ons, *PFS:ACCESS* is much better than *PC-TALK III*. But a look at the most sophisticated communications program around, *CROSSTALK*, will show how scripts and macros, used effectively, are not substitutes but rather complementary features.

A Union of Scripts and Macros

CROSSTALK XVI costs about \$200 and contains, in one form or another, every useful feature of *PC-TALK III* and *PFS:ACCESS*, except *PFS:ACCESS'* ability to learn a script by recording the steps as you go.

CROSSTALK XVI uses a very powerful script facility, but you must create the script explicitly by creating a file of *CROSSTALK* commands (see Figure 2).

CROSSTALK XVI can be told to WAIT for a particular string, or for a certain num-

Crosstalk command	Meaning
WAIT STRING "User ID:"	(wait for CompuServe's prompt)
REPLY ABCD1234.8888:	(reply with your CompuServe user ID)
WAIT STRING "Password:"	(wait until CompuServe requests password)
REPLY FREDDY:	(reply with your CompuServe password)

Figure 2: A set of commands, excerpted from a typical script file, instructing *CROSSTALK XVI* to sign on to CompuServe.

ber of seconds, or for a particular number of characters to be received, or until there have been no characters sent for a certain number of seconds, or until a particular time. This last feature allows you to set up a script that waits until 8 p.m., when the prices are lower, to automatically sign on to a particular service to retrieve information. *CROSSTALK XVI* script files can include requests for operator information, and they can stop and start disk capture of information as often as desired.

You can create as many scripts as you want, for as many services and accounts as you want. A script can also contain instructions for loading macros into each of the PC's function keys, as well as the Ctrl-, Alt-, and Shift-function key combinations, for a total of 40 macros in each script file. Macros can also be loaded easily, on an ad hoc basis, at the beginning of an on-line session.

This opens the intriguing possibility of cross-service commands. Every on-line service has its own command language, but they all accomplish, in the end, much the same functions. Every service has a PRINT or LIST command, a CHANGE DATABASE command, and a SEARCH

command, for example. Those who use more than one service can easily get confused about the syntax of the particular command in the service being used. Wouldn't it be easier to, say, assign the F1 key to the PRINT command, the F2 key to CHANGE DATABASE, and so on for the common functions? Then the script that is used to sign on to the service could include commands that load the function keys with macros containing the commands for that particular service. In operation, then, hitting F1 while connected to Dialog would generate Dialog's PRINT command; while connected to NewsNet, NewsNet's PRINT command, and so on. Only *CROSSTALK XVI*, of the common communications programs, offers this kind of power.

There are still many people in the world who use dumb terminals to gain access to database and other on-line services. But, as this brief survey should indicate, your PC puts you miles ahead of them right from the start, giving you a wide range of useful functions. Dumb modems and dumb terminal programs don't take advantage of the power of your PC; smart modems and smart software do. ■

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DATABASES: BELIEVE IT OR NOT

Looking for a date, a UFO, or an electronic shopping mall? On-line databases currently offer services ranging from the mundane to the esoteric and from the specialized to the spiritual.



Illustration: Mark Probert

When all is said and done, you have to admit that there's something terribly tempting about being able to sit in front of your PC and easily access a limitless array of specialized information, discussion, and esoterica that you might normally ignore. On-line databases such as The Source or Dow Jones are enormously informative, especially to those whose livelihoods depend upon access to current data. Some on-line systems may sound useless—even ludicrous—to many, and yet they are currently being accessed by thousands of modem users across the country. It all depends on what you're looking for.

Flying High

If you are interested in aeronautics or have a fear of flying, you may want to consult the Accident/Incident Data System (AIDS), which is put out by United Information Service, Inc., courtesy of the Federal Aviation Administration. AIDS contains information on all the crashes and "incidents" (near-misses) that have occurred in the last 5 years. This information helps professionals keep track of similarities among accidents and suggest recommendations of new procedures to avoid future problems. Ordinary air travelers can use AIDS to find out what happened to the last flight to their destination city and if they should bring along a good supply of tranquilizers.

A Born-Again BBS

Computers for Christ provides information on both Testaments and on other religions—along with discussions on religious topics. The information, which is meant to aid the faithful in their ministry,

is fairly complete, and you can access reams of information on Catholicism and Christian sects such as the Mormons (including the entire text of the Mormon Temple ceremony), the Baha'is, and the Christian Scientists. Histories of Hinduism, Judaism, and various "cults" are also available.

The sysops of this particular bulletin board are not fooling around and appear to be very aware that disrespectful hackers may attempt to crack the system. Each call to Computers for Christ nets you more time on the system and the next "authority level"; any misuse of the system hurls you down to the lowest level of authority.

Aid to the Disabled

The Handicapped Educational Exchange (HEX2) is a specialized but very useful database. This local area database provides information for disabled people, with an emphasis on the hearing impaired.

The local area network, which was developed in 1979 with a grant from the Department of Education and is currently connected on two lines, features lists of resources and organizations, explanations of how the teletypewriter devices used by deaf people to communicate over the telephone lines can be modified to accept computer input, and an active bulletin board that offers lively discussions of issues relevant to HEX2's users.

X-rated Messages

Ralph Records' Big Brother bulletin board opens with the following warning: "This bulletin board does not censor the messages that are placed in it. Disgusting language, repulsive concepts, and revolu-

tionary thinking may abound. If you can't stomach that kind of thing, hang up now!"

Besides listing messages composed of unprintable words, Big Brother relates the latest in new wave and esoteric music gossip and takes orders for records. The people at Ralph Records, a small record company in the Bay Area, are a little dazed at the success of their venture; they began the service on February 1, 1984, with an eye toward providing access for a thinly spread customer base, and they are now unsure whether their equipment can handle the flow of responses.

"We're a really small label," says a Ralph Records' spokesman, "and we deal with esoteric records and widely scattered customers. We had the idea of using a computer to gather everyone into an accessible group. The response has been phenomenal." They now have approximately 500 steady users on a two-disk-drive system and are considering expanding when the experiment is a year old. "It's pregnant with possibilities," he muses.

Horsing Around

HORSE, which is produced by the Bloodstock Research Information Services, has everything you might ever want to know about thoroughbreds, including the breeding and racing records of North American racers from 1922 to the present.

"It was just a matter of demand," says vice president Ray Gillespie. "There seemed to be a need in the marketplace for information that was current and easy to access in this field."

HORSE's users tend to fall into three main categories: thoroughbred owners and

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MAY SOUND USELESS—EVEN
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breeders, various thoroughbred publications, and bloodstock agents, who deal with the buying and selling of horses.

Urban Research

Control Data Corp.'s Local Government Information Network (Login) is a resource for urban planners who need information on a variety of topics related to local government issues. For example, users can research ways to find the money in the budget to afford to use on-line database services. Login currently has about 135 customers, but because it is an expensive service, it is not expanding by leaps and bounds.

Electronic Shopping Mall

While shopping by computer hasn't become an everyday event, at least one company is doing its best to make it a convenience. Compu-U-Card has been offering its services to computer consumers since 1979, and its Comp-U-Store is now available on The Source, CompuServe, Dow Jones, and directly through its own service. By scanning menus of various categories and paying an annual fee of \$25, consumers can order a variety of items at up to a 40 percent discount.

"We can do it because we have multiple sourcing," explains vice president Dinah Lin Cheng. "Our vendors know they must give us a good price to keep our business, and the cost of sale is nil on their end. Of course, we began with upfront and computer costs, but once we had that in place, we could handle huge sales without much cost."

Compu-U-Card has recently introduced a new service aimed at young, upscale professionals—Comp-U-Mall.

"The idea is to have it become an electronic shopping mall," says Cheng, "with lots of specialty stores, and to let retailers come onto the system under their own name. People can now choose to go into

Comp-U-Store, or Neiman Marcus gifts, or New York Times Bookshops.

"Later, we plan to have an automobile showroom. Customers can get quotes now, but it's not yet a computerized sys-

GETTING THERE

On-line database entrepreneurs are making money by helping new or harried users find and use specialized information systems.

Books have been written on how to find, subscribe to, and use many of the major (and smaller) on-line databases now available; but the prospect of sorting through the information needed to access the information you want can be somewhat daunting—especially to users who may not have the time or the inclination to spend several hours at the task. Therefore, it is not terribly surprising that a few enterprising companies are doing their best to make things easier for new or harried users—and to make a few dollars in the bargain.

For example, the Business Computer Network, which went public this summer, is offering users a new free software package, *Superscout*, that hooks in Hayes Smartmodem users with BCN's mainframe computer. The computer routes the call through to the requested database, handles all the passwords and billing, and takes care of everything except the actual interaction. The cost to users is 25 cents per use (with a minimum of \$5 per month), plus any costs incurred by the database itself. BCN currently offers its customers access to 12

databases, including CompuServe, BRS, MJK Commodities, Western Union's Easyline, and Dialog.

Another package meant to make accessing information easier is *Scimate*, produced by the Institute for Scientific Information. Users of four on-line databases—Dialog, STC Orbit, The National Library of Medicine, and the Bibliographic Retrieval Service—follow a series of menus that request all the necessary information. The software then translates its instructions to all the appropriate codes and commands needed by that particular database.

Scimate is available bundled with its own *Personal Text Manager*, which downloads and dumps the information into user files. According to representative Dan Giancaterino, *Scimate* has been available for about a year and hopes to incorporate soon. Eventually, the company may add more databases to the software but, for now, it's satisfied with the response. "Most users use Dialog and BRS," he observes. "The others aren't quite as popular with our customers." —B.K.

WHERE TO CALL

If you're interested in contacting any of the database services mentioned in this article, here are their addresses and phone numbers.

Accident/Incident Data System
United Information Services, Inc.
P.O. Box 8551
Kansas City, MO 64114
(913) 341-9161

Comp-U-Store
Comp-U-Card of America, Inc.
777 Summer St.
Stamford, CT 06901
(203) 324-9261
(800) 243-9000
or via The Source, CompuServe, or
Dow Jones.

Computers for Christ
(408) 997-2790 (modem—300 baud,
8-bit data word, 1 stop bit, no parity)

**Handicapped Educational Exchange
(HEX2)**
(301) 593-7033 (modem—300 baud,
8-bit data word, 1 stop bit, no parity)

HORSE
Bloodstock Research Information
Services, Inc.
1750 Alexandria Dr.
P.O. Box 4097
Lexington, KY 40504
(606) 278-0411

Login
Control Data Corporation
P.O. Box 0
Minneapolis, MN 55440
(800) 328-1921

Ralph Records' Big Brother
The Cryptic Corporation
109 Minna #391
San Francisco, CA 94105
(415) 546-0881
(modem—300 baud, 8-bit data word,
1 stop bit, no parity)

Scimate
Institute for Scientific Information
3501 Market St.
Philadelphia, PA 19104
(800) 523-4092

SuperScout
Business Computer Network
1000 College View Dr.
Riverton, WY 82501
(800) 446-6255
(800) 442-0982 (in Wyoming)

UFONET
(303) 278-4244 (modem—300/1200
baud, 8-bit data word, 1 stop bit, no
parity)

tem. Soon they will be able to put down the features they want, and the price will be mailed back to them."

Dial a Date

No discussion of on-line resources would be complete without some mention of the dating services, resembling newspaper personals columns, that have flooded the telephone lines. Moreover, if you're a female looking for a date, you have the advantage of extremely good odds—it's been informally estimated that men outnumber women on-line by ten to one.

Matchmaking sessions usually open with a questionnaire, with questions ranging from perky to prurient, and then attempts to match users with their "perfect" mates. Two systems found in various parts of the United States are Dial-Your-Match and MMMMMM, which stands for Marc the Martian's Mixed-up Matching & Message Machine. Other matching services abound, for a variety of sexual preferences.

Star Search

For those whose heads are really in the clouds, there is UFONET, a bulletin board for people interested in extraterrestrial life and extrahuman intelligence. When you sign on to the service, you are immediately greeted with a listing of such activities as invitations to the Second Bermuda Triangle Expedition, the National Psychotronics Conference, which deals with exotic and mundane methods of life-energy alteration through resonance, and the National World UFO Conference. Once into the bulletin board, you can "beam up" to conferences on varied topics—that is, if you can stand the altitude. ■

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The Game

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ON-LINE HOUSE CALLS

Knowledge Index and BRS After Dark are stripped-down spin-offs of major commercial on-line databases specifically tailored for home users.

Information junkies take note: The era of the home dial-up research service has arrived. Need to know about the latest studies on herpes or black lung disease? Want to check out what *Fortune* has been saying about interest rates? Interested in what Boy George has been up to lately?

Two new on-line database services—Knowledge Index (KI) and BRS After Dark (BRS)—are competing to help you answer questions such as these—as well as others on just about any subject you can imagine. With no more than a PC, a modem, and a phone line, you can now use sophisticated search techniques to browse through hundreds of thousands of documents in dozens of specialized databases.

Until recently, only libraries, corporations, and other well-heeled organizations had access to such powerful research services. But the proliferation of microcomputers has made it profitable for the major on-line database companies to offer stripped-down, cut-rate services to home users during nonbusiness

hours. KI represents a subset of the Palo Alto-based Dialog database, and BRS After Dark is the little brother of the BRS Search System of Latham, New York. But even the limited versions reviewed here provide enormous research power.

KI and BRS are both a little like having a large city library's periodical room on your desktop, except for one important difference: for the most part, they provide only references and abstracts, not the full texts of the articles they cite. In effect, they are annotated bibliographies that can be searched with great speed and precision. They can't immediately produce the documents, but they can tell you which ones are worth looking up.

KI and BRS cover much of the same ground and are targeted for the same market, but each has a distinct personality. BRS is more sophisticated; it offers almost twice as many databases and can be searched in more precise and elegant ways. It's also cheaper, if you use it at least a couple of hours a month. KI, on the other hand, offers a few

useful databases that BRS does not, and it provides some unique and handy features, including an on-line command that lets you order hard copies of the full text of documents—a godsend for users without easy access to a major library.

Basically Identical

The basics of the services are identical. A simple research session, on either service, might work something like this: Suppose you want to examine the connection between left-handedness and dyslexia. You dial the service, log on, and decide which of several dozen specialized databases is likely to best cover your subject. In this case it might be the PsychIN-

FO database (offered by both KI and BRS), which includes abstracts of articles from over 1,000 different psychology journals. Once you are in PsychINFO, you enter the word *dyslexia*, and the system tells you that there are 798 articles in the database on that subject.

That's far too many to page through individually, so you narrow the field by including the phrase *left handedness* (without the hyphen) as another subject heading. The system then tells you that six articles cover both subjects. This number is small enough to deal with, so you give the command to display the references and abstracts. The title, author, date, number of pages, and the abstract, as well as any supplemental information, are displayed in separate fields. The abstracts may tell you all you need to know, but even if they don't, they should at least indicate which articles are worth reading in full. To read the entire article, you can go to the library or, if you're using KI, order a hard copy.

Obviously, a research service must be judged on the information it contains. Both KI and BRS contain millions of references and abstracts organized by subject matter into specialized databases. Many of these specialized databases are compiled by outside sources and sold to KI and BRS, and ten of the most useful and popular are offered by both services. These include standard indexes of abstracts in math, medicine, agriculture, business, biology, education, engineering, and psychology. Both services also offer an electronic version of *Books in Print*, abstracts from popular magazine articles, and summaries of documents in the U.S. government's National Technical Information

Service. Both are also strong on software- and microcomputer-related databases. After running through this common core, though, KI and BRS strike off in entirely different directions.

Different Directions

With 45 databases in all, BRS offers almost twice as many as KI's 23. BRS concentrates on education, finance, and the social sciences, though some of the databases in these categories are specialized to the point of obscurity. In the education section, for example, BRS includes a database on teaching exceptional children, another on bilingual education, and one on educational programs available for schools. Educational references cover books, films, and audio tapes, in addition to journal articles. In the social sciences, one database gives prices and descriptions for physical rehabilitation products, while another contains critiques of thousands of different psychological tests. BRS also offers a collection of articles on robotics compiled by Cincinnati Millicron, a database of religious periodicals (a search on the word *eschatology* listed 241 documents), and abstracts of U.S. Patent Office Filings. (A tour through the Patent Office database can be a real eye opener. In January 1981, for example, Judith and Severin Schurger filed for a patent on a flyswatter for the squeamish. The swatter's handle conceals a tweezer "for picking up dead flies and the like.")

The National College Databank is an unusual BRS database that lets you look up information about any college in the country or select colleges that meet certain



**BOTH KI AND BRS ARE A LITTLE LIKE
HAVING A LARGE CITY LIBRARY'S
PERIODICAL ROOM ON YOUR DESKTOP,
WITH ONE IMPORTANT DIFFERENCE:
THEY PROVIDE MOSTLY REFERENCES AND
ABSTRACTS, NOT FULL ARTICLES.**

criteria. One simple search procedure, for example, could obtain a list of all the schools where you could major in naval architecture while earning a letter in lacrosse.

Five BRS databases, unlike any in KI, contain the full texts of documents. Online versions of the *Academic American Encyclopedia* and the *Harvard Business Review* are important and useful, while the full text of the *American Chemical Society Journal* and of selected papers delivered at medical conferences generate less widespread interest.

KI avoids extreme specialization, which keeps its total number of databases low, but it still manages to cover some fields that BRS ignores. KI's legal-information database culls articles from more than 720 law journals, and its two news databases index the complete contents of the nation's major newspapers. In its coverage of microcomputers, KI includes four separate databases devoted to software as well as to literature in the field. Nonetheless, its breadth of material can't match that of BRS.

Operation Basic commands to initiate searches and to move around within databases are much the same in both services. The syntax for search patterns is also very similar. Both systems allow the use of AND, OR, and NOT to build specific searches that can, in turn, be refined by using parentheses. For example, to locate articles on computer crime you could enter the sophisticated command:

(CRIME OR FRAUD OR THEFT) AND
COMPUTER

This searches the database for documents that deal with computers and with any of the synonyms within the parentheses. The synonyms approach picks up the largest number of relevant documents; it would be a pity to miss a good article on computer fraud while searching for computer



crime. If, on the other hand, the search turns up a host of unwanted documents dealing with the theft of computer hardware by burglary, you could exclude them from the search by adding NOT BURGLARY to the command.

However, even this sophisticated search procedure occasionally can lead you astray. A search by key word or phrase scours the entire entry of each document, and the word *computer* could very well occur in the abstracts of articles that are not primarily about computers. To solve this problem, both KI and BRS let you refine a search by limiting the keyword search to specific fields. In most KI databases, the only fields that can be searched independently are the author of a document and the name of the journal in

which it appears. Thus, the KI search command

INFLATION AND JN-FORTUNE NOT
AU-SAMUELSON

scans a database for articles on inflation that have appeared in *Fortune*, but that were not written by Samuelson.

KI's software database is the major exception to the author/journal limitation on search fields. You can search this database by vendor name, memory requirements, and release date—as well as by subject.

BRS, on the other hand, lets you search for key words in any field in a database entry. These generally include the date of publication, the language the document is written in, the title, the author, and the name of the publication. Thus, for a simple periodical search, you could ask to see all the articles in a database that were published in 1979, have the word *cannibalism* in the title, and are in Spanish or French. You can combine a search by field with the complex searches by subject described earlier.

Each BRS database may have entirely different search fields. The colleges database includes fields for majors, varsity sports, location, percentage of students with SAT scores over 600, and many other similar categories, all of which can be used to refine a search. The software index will respond to a field-based search for a

KNOWLEDGE-INDEX

list of spreadsheet programs that can run on the IBM PC, require 64K of memory, and are published by companies based in Illinois.

Choosing a Database

Search by field gives BRS After Dark a clear advantage over Knowledge Index. A search by key word in the document title alone can be far more useful than KI's subject search, in which an article will be listed even if the key word appears only incidentally in the abstract. Unfortunately, since both KI and BRS use databases supplied by outside sources, different databases may not use the same codes to indicate the same fields. Most BRS databases use AU to specify author field, but *Books in Print* perversely uses MN. The lesson is clear: It's a good idea to look up the field symbols in the user's manual for unfamiliar databases, or be prepared for the inevitable confusion.

Although BRS outshines its competitor in breadth of information and sophistication of search techniques, KI's ability to provide hard copies of full texts may make the difference for some potential subscribers. Reprints of the many references from small, obscure journals might be difficult to get hold of for BRS subscribers without access to the resources of a big library.

KI also offers on-line help. Though it charges you \$24 an hour for the privilege, KI will get you out of a tight spot with a few easily remembered help commands. KI also sends its subscribers a chatty, quarterly newsletter to help you while away the hours when you're not reading the screen, and its manual is far superior to BRS'. Still, for my money, BRS is the

better service. Its greater variety of databases and its powerful field-search capability make it a better tool for researchers.

Nevertheless, both services are easy to learn, respond quickly at 1200 baud, and bring tremendous quantities of data to your computer screen. For writers, researchers, and the just plain curious, they present unprecedented access to an unprecedented amount of information. If

they have a defect, it is that they contain only recent information. Most of the databases on both services got started in the 1960s or 1970s and ignore all the research published before then. Serious scholars will have to continue to scour the back shelves of libraries for classic texts, but dial-up research is so quick and convenient that most people will find it easy to forget that the world did not begin when electronic databases were born. ■

INDEX

Knowledge Index

Dialog Information Services, Inc.

3460 Hillview Ave.

Palo Alto, CA 94304

(800) 227-1927

(800) 982-5838 in California

Hours: Monday through Thursday from 6 p.m. to 5 a.m. Saturday from 8 a.m. to midnight. Sunday from 3 p.m. to 5 a.m. on Monday, all local time.

Networks: Tymnet, Telenet, Uninet.

Rates: \$24 per hour flat rate for every minute of connect time. The charge is the same for 300 or 1200 baud. A subscription fee of \$35 entitles the user to 2 free hours of connect time. Bills must be charged to a credit card. KI automatically disconnects if it receives no input from the keyboard for more than 5 minutes.

The charge for on-line orders of documents from most databases is \$6.25 per item plus 20 cents per photocopied page. Orders are billed to your credit card.

Help: Free telephone help is available during all of KI's operating hours.

CIRCLE 755 ON READER SERVICE CARD

BRS After Dark

1200 Rte. 7

Latham, NY 12110

(800) 833-4707

(800) 553-5566 in New York

Hours: Monday through Friday from 6 p.m. local time to 4 a.m. Eastern time. Saturday from 6 a.m. Eastern time to 4 a.m. Sunday, Eastern time. All day Sunday except from 2 p.m. to 7 p.m. Eastern time.

Networks: Uninet, Telenet.

Rates: From \$6 to \$21.50 per hour, according to the database being accessed. The charge is the same, regardless whether you are using 300 or 1200 baud. There is a one-time subscription fee of \$75 and a monthly minimum connect charge of \$12. Charges must be billed to a credit card. BRS stops charging you after 10 minutes without input.

Help: Free telephone help is available Monday through Friday from 8 a.m. to 1 a.m. the next day; Saturday from 8 a.m. to 5 p.m.; and Sunday from 8 a.m. to 2 p.m., all Eastern time.

CIRCLE 756 ON READER SERVICE CARD

Qubie' gives you the three Pluses: Quality, Service, & Low Prices

We were tempted to headline this ad with "The 1, 2, and 3 of why you should buy AST from Qubie." We are as tired of ads with that logo as you are, so we settled on three pluses. Actually, the plus really tells it better. The AST Research plus of quality is the reason they have the number one expansion products for the IBM PC. The Qubie Plus of service has made us the largest AST dealer. You don't supply the likes of IBM, Exxco, General Motors, and Lockheed, unless you have premier products and service. Top it all off with low, Qubie prices, and you have the reason tens of thousands of corporations, institutions, and PC owners have come to Qubie for their expansion needs.

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MegaPlus II™

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- Memory sockets for up to 5MB
- AST SuperPak Software & Q-Quick Menu

Options:

640 memory	\$35	GraphicPlus	\$40
2nd printer port	\$35	MegaPac 256K	\$295
		MegaPac 128K	\$195

SixPacPlus™

Includes:

- Clock indicator with battery back-up
- Asynchronous communications port, RS232C serial, COM1 or 2
- Memory sockets for up to 5MB
- Parallel Printer Port (LPT1 or 2)
- AST SuperPak Software & Q-Quick Menu

Options:

640 memory	\$35
Graphic Option	\$35

I/O Plus II™

Includes:

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- Asynchronous communications port, RS232C serial, COM1 or 2
- AST SuperPak Software & Q-Quick Menu
- One year Parts & Labor warranty

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Printer Port	\$35
2nd Printer Port	\$35

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Includes:

- IBM PC compatible Monochrome Card
- IBM PC compatible graphics
- Clock indicator with battery back-up
- Parallel Printer Port
- AST SuperPak Software & Q-Quick Menu

Options:

Serial port	\$35
-------------	------



Free Monitor Stand with purchase of MegaPlus-256K or SixPacPlus-384K. \$39 value.

The Acid Test

Remember, our price is the whole price. No extra charges for shipping, insurance, credit cards, or COD fees. In a hurry? UPS 2nd day air service is just \$5 extra. If you are not completely satisfied with any Qubie product after 30 days, you can return it for a full

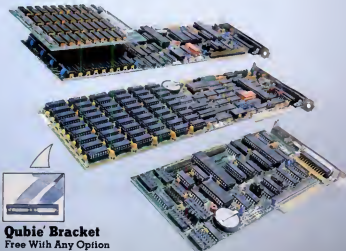
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The Qubie Plus

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CIRCLE 334 ON READER SERVICE CARD

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"Excuse Me,



"Make Way for Hayes' Please!"

An advanced, easy-to-use data management system for the IBM® PC and compatibles.

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"The menu, Please?"

Menus list all your options and tell you exactly which keys to press for every *Please* feature.

That's to be expected. As the telecomputing leader, Hayes built its reputation on quality design, reliability

and customer support. Now these same standards have been applied to a new data management system that is going to instantly change the way you do business!

Say you're looking for an efficient way to maintain sales data. *Please* leads you every step of the way in creating a sales database that might include names, addresses, dates and figures. These categories are called "fields" in database lingo, and they're the very heart of your database structure.

Want last month's total in a particular region? Press a few keys and it's yours! A few more keystrokes and you'll know who's moving product, and what's your biggest seller.

Please will supply you with labels for a mailing to selected customers. It can send customer information to your word processor for a promotional letter. And it can receive data from

your spreadsheet program. *Please* will even look up a name and company for you, your Hayes Smartmodem* will dial the phone number, and you're ready to talk!

Taking this same sales database, you might also want to define special

"Make it snappy, Please!"

Need a report fast? You and *Please* can put together a Quick List in a matter of seconds.

fields for a custom Output Plan. With a defined field for "COMMISSIONS DUE!" *Please* can automat-

ically compute each salesman's commissions, and print them out in a report of your own design. All this and more, just for saying "Please!"

And if you ever change your mind and want to change the structure of your database, please feel free. Step-by-step instructions show you how.

You have this same flexibility with any database you and *Please* design. You can store up to 16 million records and 200 custom Output Plans for each database! More than you're likely ever to require. But isn't it nice

Please."



"Put it here, Please."

Design a special screen format to position data in a particular place.

knowing all that storage power is there?

Just in case you ever need it?

Now you might think that a data management system that does all this must be difficult to use. Right? Rest assured, *Please* works hard so you don't have to. An easy-to-follow sample disk shows you everything you need to know to create your first database. Three *Please* menus show you which keys to press to access every feature. And whenever you need it, *Please* provides on-screen HELP messages, tailored to a specific task. So you needn't waste time reading through a list of unrelated instructions on your screen. Or stop what you're doing to consult a manual. In no time at all, and with no assistance at all, you'll be a *Please* database pro!

"Merge these, Please."

Combine data from one database into another, without changing your original.

Everything about *Please* is designed to save you time and effort. So what could make data management even easier? *Please Application Templates*, that's what!

To help you get up-and-running immediately, we've developed a series of practical, pre-designed templates. You'll appreciate their well-thought-out structure, and "fill-in-the-blank" ease. Choose several for business and personal use.

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ON-LINE NETWORK NEWS

NewsNet's on-line database offers access to over 200 special-interest publications covering 32 industries—a \$50,000-a-year value that costs subscribers \$24 an hour. The service's unique information and relatively low price have swollen its subscriber list to over 6,000.

A modem lets you tie into hundreds of databases, each with its own unique services. There are financial databases, graphics databases, and software databases. But only one covers 32 industries, letting you tap information from 200 special-interest newsletters and all sorts of press releases. It's called NewsNet, and it may have just the information you're looking for.

A subsidiary of Independent Publications, Inc., of Bryn Mawr, Pennsylvania, NewsNet was started 2 years ago in the hope that plenty of users would pay for access to publications dedicated to specific fields of interest. At first, only a handful of users subscribed to get access to a handful of newsletters, but the database (and the subscriber base) has grown dramatically. Today NewsNet boasts a list of 200 newsletters and over 6,000 subscribers.

NewsNet's president Jack Buhsner feels that this service is pretty special. "We don't compete with any other system for the information that we provide. We do compete for the on-line dollar, but our information is unique." According to Buhsner, no other database provides newsletter information in the same way or for the same price. He estimates that to subscribe in print form to every newsletter on NewsNet would cost about \$50,000 a year.

NewsNet provides up-to-the-minute information on a variety of topics. Advertising, marketing, and PR firms subscribe to get the latest information on their clients. Law firms use it for research, and tax firms use it to find the latest tax information.

Many newsletters are produced by as few as one or two experts in a given field, and each focuses on a single industry—conducting and reporting on

research, interviewing key figures, and analyzing industry trends.

Newsletter publishers must meet certain criteria to be allowed on NewsNet—their publications must be published at least once a month, be priced at over \$100 per year in print form, and be uploaded directly to NewsNet mainframes from their places of origin. Newsletter publishers do not have to pay any fees to NewsNet to be put on-line. Actually, the opposite holds true. NewsNet has a royalty arrangement with the publishers, who set their own prices for users who choose to read their publications on-line.

O n-Line Advantages

Most of the newsletters are available in printed form, but the ability to retrieve information on any topic of

interest is an appealing advantage of having them all on-line. The service offers a multitude of topics, from aerospace to taxation and finance. Once you've chosen a newsletter, you can read the entire publication or simply scan headlines (using the SCAN command). NewsNet lets you specify a range of dates or go back to 1982 and start there.

The most attractive feature NewsNet offers is the ability to conduct searches by key words. One or more key words can be used, and by specifying date ranges you can get the most timely and relevant information. Easy to do, searches usually take just a few seconds to a few minutes. The search yields a numbered list of publications and article headlines containing the key word; you can choose to read any article listed.

You can also analyze your searching results with an Analyze feature, which gives you a count of matches listing the newsletter code, name, and number of occurrences found.

Detailed information on specific industries can be found easily. For example, in the electronics and computer database, 18 separate newsletters are devoted to computers alone. "IBM Watch" is one that features the latest developments at IBM and reports on IBM announcements within 48 hours. "Modem Notes" features information on modems, databases, and the telecommunications field. "The Computer Cookbook" is an encyclopedic service offering A-to-Z entries on systems, languages, and software. And "Computer Market Observer" tracks the latest marketing, financial, and personnel developments in the computer

industry, including contract awards, joint agreements, earnings reports, and personnel news. Similarly detailed information can be found for any industry covered in NewsNet.

After applying for the service and receiving the well-documented booklet and accompanying user ID and password, subscribers can log onto NewsNet. Local Tymnet and Telenet numbers connect users with the system; NewsNet pays for the access charges to these networks.

Although there are no initiation fees, there is a \$15 minimum monthly charge for using the system. Basic daytime rates (8 a.m. to 8 p.m.) for general NewsNet services are \$24 per hour, while evening (8 p.m. to 8 a.m.), weekend, and holiday rates offer a 25 percent discount of \$18 per hour. At 1200 baud, prices are double.

As mentioned before, individual newsletters are priced differently. While reading headlines and searching for information, you are charged NewsNet's basic rate, but when actually reading a newsletter, you pay a rate set by its publisher.

There are generally two rate structures that apply when reading a newsletter—validated and nonvalidated. The validated rate applies to those who subscribe to the publication in print form, and the nonvalidated rate applies to those without print subscriptions.

For example, the validated read rate for *Television Digest* is the same \$24-per-hour charge that NewsNet uses; the nonvalidated rate is \$48 per hour. Almost three-quarters of the newsletters carry nonvalidated charges of \$48 per hour or less. Since the average article on NewsNet is just over 1,000 characters in length, the cost to read an article at 300 baud is typ-



**NEWSNET IS AN EXCITING SERVICE. IF
YOU DUMP THE ARTICLES TO DISK, YOU
CAN SPEND MANY HOURS READING
NEWSLETTERS YOU COULD OTHERWISE
OBTAIN ONLY AT GREAT EXPENSE. IF
YOU WANT INFORMATION, IT'S THERE.**

ically 13 cents for validated subscribers and 26 cents for nonvalidated users.

With *Television Digest* as an example, a test was conducted to see whether it is less expensive to use NewsNet or subscribe to the print edition. *Television Digest* is published each week for a total of 52 issues a year; a print subscription costs \$426 a year. At 1200 baud, it took roughly 4 minutes to display the entire newsletter on the screen. If you use that figure as an average, the nonvalidated read rate of \$48 per hour is doubled for 1200-baud service, for an hourly rate of \$96. That comes to a yearly cost of \$333—a savings of \$93 per year. Every newsletter is priced differently, but searches of many newsletters should be cost-effective.

Other NewsNet Services
NewsNet offers a number of "extras" aside from the Scan and Search features, all of which are charged at the basic rate of \$24 per hour.

NewsFlash, for instance, is a clipping service that automatically retrieves articles in your area of interest. Every time



NewsNet
945 Haverford Rd.
Bryn Mawr, PA 19010
(800) 345-1301
(215) 527-8030

Rates: Basic rates are \$24/hour (day) and \$18/hour (night). Rates while reading individual newsletters vary.
Requires: Modem and communications software.

CIRCLE 754 ON READER SERVICE CARD

you sign onto NewsNet, the system displays new matches for key words that you previously specified for NewsFlash and saves the matches in a user file.

If you need to keep track of exactly when and how much you use NewsNet, the Project feature will come in handy. It enables you to turn a tracking mechanism on or off. You can assign a "project code" to the tracking command for each session, and you are presented with the elapsed time for that session. The monthly invoice will also itemize your NewsNet sessions according to the project codes.

The Library feature allows you to examine a sample issue of any newsletter to determine whether it covers your area of interest. NewsNet also has an electronic mail feature that lets you send mail to NewsNet or any of the publications on-line; but you can't use this feature to communicate with other subscribers. Publications can send electronic mail to you as well. There is no on-line charge to use this feature.

Finally, if for some reason you need a print subscription for a particular newsletter, you can order it on-line. The publisher reads your order—complete with your name, address, and NET number—as a piece of electronic mail. From there it is processed, and you receive the print edition via regular mail.

NewsNet's newsletters are divided into 32 categories: advertising and marketing, aerospace, automotive, building and construction, chemical, corporate communications, education, electronics and computers, energy, entertainment and leisure, environment, farming and food, finance and accounting, general

business, government and regulatory, health and hospitals, insurance, international, investment, law, management, medicine, metals and mining, office, politics, publishing and broadcasting, real estate, research and development, retailing, social sciences, taxation, and telecommunications. All this plus the PR wire (which features industry press releases), *Official Airline Guide* flight information, and UPI news. In addition, specific newsletters are cross-indexed in up to two additional categories, chosen by the publisher. For example, "IBM Watch", listed under electronics and computers, is cross-indexed with the telecommunications and office categories.

Each category has its own category code, which is combined with the appropriate newsletter number. A pricing feature displays the codes and prices for all NewsNet publications and services.

If you have a computer, a modem (300 or 1200 baud), and telecommunications software, you can access NewsNet in much the same way as you would access any other remote service. Since the NewsNet mainframes are the ones used by The Source, communications parameters are the same for both services. If you do not have a computer, NewsNet will lease you a Scanet 415 Video Terminal equipped with auto-dial capacity for \$39 per month. And if you want hard-copy capability, you can lease a Scanet/printer configuration for \$78 per month.

NewsNet is an exciting service. If you dump the articles to disk, you can spend hours reading newsletters you would otherwise obtain only at great expense. If you want information, it's there. ■

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HAVE TO
REMODEL
TO ADD ON.**



With some computers, the more you do, the more you have to add on.

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Once it's in, you experience something akin to waking up inside a novel. You find yourself at the center of an exciting plot that continually challenges you with surprising twists, unique characters (many of whom possess extraor-



dinarily developed personalities) and original, logical, often hilarious puzzles. Communication is carried on in the same way as it is in a novel—in prose. And interaction is easy—you type in full English sentences.

But there is this key difference between our tales and conventional novels: Infocom's interactive fiction is active, never passive. The course of events is shaped by what you choose to do. And you enjoy enormous freedom in your choice of actions—you have hundreds, even thousands of alternatives at every step. In fact, an Infocom



interactive story is roughly the length of a short novel in content, but because you're actively engaged in the plot, your adventure can last for weeks and months.

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*Use the IBM PC version for your Compaq and the MS-DOS 2.0 version for your Wang, Modula, Data General System 10, GRI and many others.

LEXIS, NEXIS, AND PCs

Mead Data's Lexis and Nexis on-line databases offer massive amounts of legal and periodical information—with just a phone call from your PC.



Illustration: Mark Peckerty

Words and numbers are the ore of the information economy, and Mead Data Central houses about 70 billion of these nuggets in an earthquake-proof computer room. One of its on-line databases, Lexis, contains 25 gigabytes of legal documents, while its other service, Nexis, includes the full texts of more than 100 newspapers, magazines, and news-wires. The information contained on the two databases would translate into a stack of paperback books six and a half times as high as the Washington Monument. If an average reader spent 8 hours a day reading just the material in the Lexis database, it would take him 435 years to plow through it all.

Mead's computer center is the daily target of some 16,000 telephone calls from places such as Peoria and Sacramento, Washington and New York, and even

London and Paris. Law firms, some paying as much as \$30,000 a month for the privilege, mine critical case law out of Lexis, and executives prospect for crucial business information in Nexis. During peak hours, the services spew forth about a billion characters an hour—equivalent to 2,500 copies of *Catcher in the Rye*.

Each week, a total of 65,000 documents representing 213 million characters are added to the data bank. Because 95 percent of incoming legal documents are in hard copy—some handwritten—Mead ships them to South Korea where they are inexpensively keyed into computers and returned in less than 2 weeks.

About 82 percent of Nexis' time-sensitive news copy is delivered electronically via phone lines. The rest is transmitted by satellite, keyed-in manually, scanned from print documents, or entered on machine-readable computer tape. Once in the computer, the data for both services are formatted into the so-called visually integrated string format, edited for accuracy by 130 data editors, and stored in the computer, ready for retrieval.

Corn Chips?

You might expect to find a high-tech, information-age company like this in Silicon Valley, but Mead Data Central is, in fact, nestled in the cornfields of Dayton, Ohio. The Mead Data Central story began in 1970, when the Mead Corporation, an old-time paper company in Dayton, was trying to find a way to smooth out the bumps in the cyclical paper industry. The company decided that diversifying into high technology might be a good way to do it, so Mead bought a foundering local

computer company called Data Corporation, which was then helping the Ohio Bar Association set up a full-text, computerized, legal-research program. When a consulting team from Arthur D. Little recommended that Mead invest in the project, Mead overhauled the company, hired several of the consultants to run it, and formed Mead Data Central. In 1973, after a \$14 million redesign, Lexis was put on the market. Today, it has achieved nearly total penetration of law firms with 100 or more attorneys and has a healthy grip on the rest of the legal market.

Nexis was a logical outgrowth of Lexis, both to complement it and to develop new markets. Nexis contains the full texts of about 120 publications and abstracts of 162 others.

Just last year, Mead took the next step and allowed access to its information via IBM PCs and other microcomputers. Previously, customers had to use the company's custom-designed UBIQ (for ubiquitous) terminal. The long-awaited move to microcomputer access vastly expanded the company's markets. Consider that Mead installed approximately 3,000 UBIQ terminals in all of 1983, and that IBM expects to install 2 million PCs this year, an average of 5,500 a week.

With an eye to capturing a share of this enormous potential market, Mead now offers personal computer users software diskettes, documentation, and keyboard templates that allow hitting a single key to perform such common tasks as moving to the next document or beginning a new search. Packages are available for IBM's PC, Displaywriter, 3101, 3270 PC, and Portable PC, and for various Apple, TeleVideo, Wang, and Xerox computers.



**MEAD DATA CENTRAL'S PREEMINENCE
IN THE ON-LINE DATABASE MARKET
CAN BE ATTRIBUTED TO SUCCESSFUL
PENETRATION OF DEEP-POCKETED
MARKETS AND ITS DETERMINATION TO
MAKE ITS DATABASES EASY TO USE.**

Mead also established marketing agreements with IBM and AT&T. IBM, eager for an entry into the legal market, approached Mead with a marketing proposal way back in August 1981, shortly before introducing the PC. Within weeks, the two companies contracted for Mead Data to accept orders for IBM computers and pass them on to IBM for a commission. IBM, in turn, agreed to supply Mead software to PC users.

Mead officials blame poor communication and a reshuffling of staff at IBM for causing the computer company to back out of the agreement. However, the two firms are currently negotiating an addendum to the contract that will re-establish the agreement by this fall.

Mead also recently reached a similar agreement with AT&T, making Mead Data a value-added reseller of AT&T computers, and AT&T a distributor of Mead software.

U sing the System

Mead Data's pre-eminence can be attributed to successful penetration of deep-pocketed markets and its determination to make its databases easy to use. A look at how Nexis answers a typical question illustrates the results of that determination.

Suppose a Washington reporter wants to find the first mention of Congresswoman Geraldine Ferraro as a possible running mate for former Vice President Walter Mondale. The reporter sits at a computer terminal, dials a local phone number, and taps into MeadNet, the 80,000-mile telecommunications system linking Mead Data with 70 major cities nationwide.



Mead's computer center is the daily target of some 16,000 telephone calls. Its computers spew forth close to a billion characters an hour to its various clients.

The call enters one of 1,700 ports in Mead's three Amdahl 4705 front-end processors. These electronic brokers route it to one of three Amdahl 5860 central processors, each with the ability to execute 13 million instructions per second. At times, up to 700 of the ports have been busy at once, with record-setting surges following on the heels of major news events such as the assassination of Egyptian President Anwar Sadat and the shooting of Pope John Paul II.

After receiving the call, the central processor prompts the customer to log on, offers a list of files to search, and requests a search argument. The reporter chooses Nexis and types in "Mondale w/10 Ferraro." This code tells the system to search for every occurrence of the name "Mondale" appearing within 10 words of "Ferraro."

To do that, the computer dips into the Mead storage bank, made up of the equivalent of 400 IBM 3350 317.5-million-

character disk drives, with a total capacity of approximately 122 billion characters. The disk storage holds a sort of concordance that lists every word contained in the database, excluding such common words as *and*, *the*, and *where*.

The computer pulls up a list of 9,869 occurrences of "Mondale" and 5,820 "Ferraro" mentions. A previously assigned information string, or address, is attached to every word in every document. This address pinpoints the word's location in a particular disk drive, document segment (headline, text, caption, and so forth), and the exact location in the text. The computer identifies occurrences of "Mondale" and "Ferraro" falling within ten words of each other and plucks out the corresponding stories. It proceeds to put the stories in a disk drive file ready for browsing.

When I performed this search, it took 1½ minutes, produced 177 hits, and cost about \$19, including a charge of \$18 for

searching the entire Nexis file. Searching a single publication costs \$9, and discounts are offered for off-peak usage.

New Markets

Though most large law firms now subscribe to Lexis, Mead Data estimates that this represents less than 20 percent of the market for on-line legal research. And the market for the general news provided by Nexis has barely been tapped. Nexis comes free with Lexis, so it's not surprising that attorneys researching clients or legal opponents make up 40 percent of the news service's users. The media use it for news background, and corporations use it to research competitors and markets.

There's little doubt that Nexis will continue to grow. Product manager Buzz Reed has a list of 700 publications he would like to add. As the size of the database snowballs, Reed finds it easier to get contracts with new publications, further accelerating growth.

Mead executives feel that Nexis will follow the same pattern of increasing specialization that characterized Lexis' maturation. Nexis' content is now essentially lumped together, but the future should see special databases for medicine, finance, science and technology, and accounting.

Nexis recently established a toehold in the financial world with the addition of the Exchange service, which includes security analysts' reports on companies and industries. Nexis officials say they are talking with major banking firms about the possibility of distributing financial information over electronic banking networks.

Mead officials say they have no imme-

diate plans for the consumer market and note that Nexis is too costly for most individuals. But Mead has just restructured Nexis' pricing policy to make it cheaper to browse material on-line. It has also introduced an Electric Clipping Service (ECLIPSE), which allows users to track topics of special interest through a standing query that searches new entries.

Mead's 140 account representatives have cultivated a small but robust market of 205,000 users and have thus positioned the company to sell further products to that market. New product possibilities mentioned by Mead executives include more information products, system consulting services, software, and even hardware.

Mead's stubborn push toward end users instead of information specialists also opens doors for the company. For example, a current pilot project involving Mead and a large corporation will bring Mead services to the personal computers of 50 top executives.

Market Forces

The same technology that sped Mead Data into electronic publishing may also force it to change in the future. Rapid developments in video-disk storage are likely to soon make it feasible for large firms to establish their own data banks. Within the next few years, 12-inch laser videodisks capable of storing a gigabyte of read-only data on a side should become available. Copies of the disks might cost less than \$20 each, and \$10,000 might buy a player capable of supporting several microcomputer terminals.

The implications are clear. The entire Lexis database would fit on 50 such disks;

the present Nexis file would fit on 33 of them. With such equipment, nothing would prevent a law firm from downloading Lexis' entire tax file and bringing it in-house where it could be searched at will—at almost no cost. Research into erasable laser disks, which would allow a firm to update its information daily with an on-line feed, only compounds the threat.

Firms such as Mead Data, with large amounts of static data that could be downloaded onto read-only disks, will be the first to be affected. In addition, Mead's competitors, such as Westlaw, published by West Publishing Company of St. Paul, Minnesota, are almost certain to enter the disk publishing business, if only to cut into Lexis' market domination. Of course, relatively low baud rates will slow the outpouring of information. Even at 4800 baud, it would take almost 24 days to download a gigabyte of data.

Ultimately, though, Mead doesn't feel threatened by the prospect of downloaders. Instead, the company hopes to take advantage of the new technology. Mead is considering packaging data for firms' own libraries. And most analysts are confident that the continuing need for current information will ensure the prosperity of the on-line industry, although prices may have to go up on the assumption that information is being downloaded on a one-time basis. For Mead Data Central and other electronic publishers, it all depends on penetrating the personal computer market with information products that professionals—and, perhaps, consumers—will spend money to receive. ■

Tim Miller is a free-lance writer in Washington, D.C. The on-line database industry is one of his favorite topics.

Thinking of
buying a modem?
You owe it
to yourself to check out the Qubie' 212A modems.

Inside Outside

Just a few years ago, computers needed big air-conditioned rooms to operate in, balefuls of money to buy, and a team of wizards to keep them running. The constant march of technological progress has given more and more powerful machines which cost less and less. Desktop computers more powerful than the early mainframe computers are the result of the evolution. The Qubie' modems represent the latest extension of this progress. Because up until now, a 212A compatible modem cost at least \$500. Through the use of four low-cost, state of the art microprocessors, we can now offer two versions of our full featured 212A modem at prices the competition sells 300 baud modems for.

In The Beginning

In September of 1983 we introduced the first 212A modem card for the IBM PC available for under \$300. The PC212A/1200 is a complete communications package including PC-TALK III software, modular phone cable, card edge guide, and instruction manual. The modem is an auto-dial, auto-answer type, which uses all the Hayes software commands so it can be used with any of the popular software packages including Crosstalk™ and Smartcom™. We picked the best software package we could find based on it's ease of use and features, PC-TALK III. Our modem includes features the old industry standard missed out on. Like being able to fit in one slot in a Portable PC or PC/XT.

Or an optional connector to use the modem's serial port when not using the modem. Of course the topper is the \$299 price, hundreds less than the competition.

Now Available Outside

Our standalone modem, the 212E/1200 can be used with any computer or terminal with a RS-232C serial port. You can use any Hayes compatible communications software on anything from an Apple to a Zenith. Many owners of IBM PC's are using it because they lack available expansion slots, or have more than one computer they want to use their modem with.

It's attractive gold anodized case houses seven status lights (who says low prices means a shortage of features). It fits comfortably under a standard telephone. It is also a 212A compatible auto-dial, auto-answer modem which supports all Hayes software commands. Even the switch settings are the same, so any software giving recommended switch settings for a Hayes modem can be used, without knowing what the switches do. There is a volume control knob for easy adjustment of the speaker's output. Included in the package is modular phone cable, a cable to hook it to your computer or terminal, and instruction manual. Choose the communications package right for your needs, and you're ready to go!

Four Hearts

The heart of the Qubie' modems are four digital signal microprocessors. Two handle sending, and two do the receiving. Rather than attempt to filter all but the relevant tones used for modem communications, the

microprocessors measure the tones digitally. This allows them to overcome line noise and static better than analog filter based modems

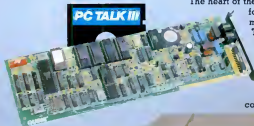
Why Buy From Qubie'

Because you will get a product as good or better than any available, pay less for it, and get factory direct help if you need it. If at any time during the one year warranty period your modem should require service, we will fix it or replace it within 48 hours. Notice also there are no hidden charges in our prices. No extra for freight, insurance, credit cards, or COD fees. In a hurry? UPS 2nd day air service is just \$5 extra. If you are like many who say, "Nah, it's too good to be true", just apply the acid test and find out. Then you will be asking yourself, "Why should I pay what these modems used to cost?"

The Acid Test

Qubie' gives you a 30 day satisfaction guarantee on your modem. If you are not completely satisfied we will refund the entire amount of your purchase including the postage to return it. If you can, get anyone selling another modem to give you the same guarantee. Buy both, and return the one you don't like. We know which one you will keep.

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212E/1200 Includes: Standalone modem with cable (specify male or female), modular phone cable, and instruction manual. **\$299**



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CIRCLE 103 ON READER SERVICE CARD

DIALING FOR FINANCIAL DATA

Commercial timesharing companies are changing from central data analyzers to suppliers of information for local analysis on microcomputers.



Illustration: Mark Peckham

Access to millions of pieces of data covering corporate financial statistics, economic indicators, and other investment statistics is nothing new. For over 10 years, companies such as Automatic Data Processing (ADP), Interactive Data Corporation (IDC), I. P. Sharp (Sharp), and Wharton Economic Forecasting Associates (Wharton) have offered access to such data through extensive networks of telephone lines hooked to large mainframe computers.

Traditionally, users connected their "dumb terminals" to a commercial timesharing service and displayed the data on the terminal screen or printed hard copy reports on printers connected to the terminal. These terminals and printers could report the results of analyses performed on the commercial timesharing company's mainframe, but the data itself and the analysis performed on it had to remain on the timesharing computer. You could not process the data locally, and you couldn't store an electronic copy of it.

The burgeoning microcomputer revolution changed all that. Micros such as the PC are "smart terminals"—they can download and manipulate the data on commercial timesharing companies' databases. You are no longer restricted to merely "looking" at the data. The PC allows you to capture the data and analyze and report the results yourself.

This ability to download and manipulate data away from the mainframe computer has permitted users to process data for a relatively fixed cost. The timesharing companies feared, however, that this advance would substantially reduce resource usage revenues (the money clients paid for analyzing data on the timesharing

company's mainframe computer). Since the bulk of timesharing revenues came from this data analysis and not from the mere extraction of data, timesharing companies were naturally reluctant to allow personal computers access to their databases.

Recently, however, market demand and recognition that commercial timesharing would have to change in order to survive have prompted the timesharing industry to encourage personal computer users to access and download data—and the more innovative companies are developing sophisticated downloading software to facilitate personal computer access to their databases. These new data screening and downloading packages make it easy to separate the data you need from the millions of pieces of data you don't need.

A look at the kinds of data and data-



bases these services offer and how they are organized, coupled with an examination of the interface software they have developed, will illustrate the current state of the commercial timesharing industry.

Data Avalanche

Dozens of companies throughout the world make commercial databases available to personal computer users. The four companies I have already mentioned, Automatic Data Processing (ADP Network Services Division, Ann Arbor, Michigan), Interactive Data Corporation (Chase Econometrics Division, Bala Cynwyd, Pennsylvania and Securities Products Division, Waltham, Massachusetts), I.P. Sharp (Toronto, Canada), and Wharton Economic Forecasting Associates (Philadelphia, Pennsylvania), are a representative sample of the industry. The four companies offer largely the same information. If you need to obtain monthly Gross National Product (GNP) statistics from January 1975 to the present, all four companies could provide you with this same "time series" for GNP. While one database might offer more history on a given series and another might vary the periodicity (that is, daily or weekly instead of monthly), the data from one company typically overlaps the data from the others.

The companies price their services on the basis of complex algorithms that use connect time, computer resources, and storage as factors. In addition, some companies add a separate fee for accessing each individual piece of data. Though total charges can be expensive for any of these services, prices remain competitive among the four.

**MARKET DEMAND AND RECOGNITION
THAT COMMERCIAL TIMESHARING
HAS TO CHANGE TO SURVIVE HAVE
PROMPTED THE TIMESHARING INDUSTRY
TO ENCOURAGE PERSONAL COMPUTER
USERS TO DOWNLOAD DATA.**

Commercial Databases

The amount of data offered, even by just ADP, IDC, Sharp, and Wharton, is almost overwhelming, but a few highlights should give you a feel for what is available. Figure 1 indicates the extensive scope of data offered by ADP alone. The matrix covers the database offerings of ADP's commercial timesharing division, ADP Network Services. Other companies have similar offerings.

A sidebar accompanying this article (see "A Financial Database Sampler") lists some of the types of data offered by commercial timesharing companies. The databases shown were derived from the ADP and IDC database descriptions. The following overview of the data offered by each of the four services, extracted from each company's marketing literature, points up some of the differences that exist among them.

● **Automatic Data Processing.** ADP offers a wide variety of databases to meet such diverse needs as forecasting sales, studying competitors, analyzing potential investments, and assessing economic conditions. ADP exclusively offers Townsend-Greenspan & Company's long- and short-term economic forecast information as well as the Bancall database, the equivalent of the SEC 10K-type information on bank holding companies, commercial banks, savings and loan associations, and a collection of the most-used business indicators of the United States economy, called Scan200. Some of these time series can include up to 30 years of historical data.

Many of ADP's databases are available without a subscription fee, which means

you don't pay for the data items you extract but only for the ADP computer processing time needed to extract it. The databases maintained by ADP are available day or night, 7 days a week. Data and access to it can be priced on a pay-as-you-go basis or under fixed-cost arrangements for large volumes of data.

● **Interactive Data Corporation.** IDC's financial databases cover more than 10,000 foreign and domestic companies, over 14,000 banks, and at least 250 utilities. Securities data is available on more than 60,000 North American securities and over 26,000 securities traded outside North America. Daily evaluations exist for more than 1.7 million municipal bonds.

Commodities, financial futures, and foreign exchange data is included. Economic information, both historical and forecast is available. Chase Econometrics databases contain over 2.5 million weekly, quarterly, and annual time series that detail consumer, demographic, industry, and general economic activity in more than 175 countries.

IDC is accessible Monday through Friday from 6 p.m. to 11 a.m. Eastern time and all day on weekends and holidays. Customer service is available from 8:30 a.m. to 6 p.m. Monday through Friday. IDC packages data in "data packets" and charges by the packet.

● **I.P. Sharp.** Sharp maintains over 50 million time series of public data, including information on economics, securities, banking, finance, energy, aviation, and insurance—over 100 different databases. Sharp pioneered the concept of making most of its databases available with no surcharge for individual data items.

● **Wharton Economic Forecasting Associates.** Wharton specializes in national and international economic data. It is also a leader in offering a wide variety of data delivery methods, including timesharing, magnetic tapes, downloading to personal computers, mailing data disks to micro users, and real-time delivery.

Wharton offers hundreds of thousands of time series. In addition to more commonly available data, Wharton offers a great deal of "exclusive" data on Europe, the Middle East, and the centrally planned economies.

Software

Aside from the data available, the choice of a commercial database rests on ease of access. With this in mind, the four companies offer downloading services. Wharton requires that you use a communications package that can capture data on disk to download data from its databases. It does not provide a communications package specifically designed to work with its mainframe computer. However, it has a data disk mail service (unique among the four companies) that distributes econometric time series data each month and/or quarter. Wharton refers to this service as the Wharton DataDisks service. Its *DataDisks User Guide* is an excellent summary of the capabilities of the service, and Wharton also lists the quarterly and monthly time series included on the disks mailed each month and/or quarter.

The *DataDisks User Guide's* section entitled "Using DataDisks" describes how to load data from the data disks into 1-2-3. Other sections describe the avail-

Figure 1: A matrix showing the database offered by ADP Network Services.

SELECTED FINANCIAL APPLICATIONS

**DEPARTMENTS
OFTEN INVOLVED**

DATA USED TO

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TEXTUAL

SELECTED FINANCIAL APPLICATIONS

A FINANCIAL DATABASE SAMPLER

A list of typical databases available from commercial timesharing companies.

ADP and IDC offer a wide range of investment, financial, and economic databases. The following sample is representative of the databases available from major timesharing companies. While some of these databases are exclusive to ADP or IDC, the data typify the information accessible through any top commercial timesharing company.

Automatic Data Processing

Disclosure II is a collection of financial and narrative data on public companies extracted from annual and quarterly 10K reports. It includes the company name, address, phone number, officers and directors, subsidiaries, ownership information, management discussion, balance sheets, income statements, and 5-year summaries of over 9,200 companies and 150 data items. Updated weekly from reports provided quarterly and annually from each company, ADP adds stock information including week-ending price, weekly volume, year-to-date and most recent week high-and-low prices, EPS, and dividend information.

Compustat provides summary financial data, by lines of business, for up to 7 years of data. Covering 6,000 companies, it's updated weekly from annual reports. The Industrial Compustat database provides up to 20 years of annual and 10 years of quarterly data on all public industrial firms in the United States, and key Canadian industrials. The data

cover balance sheets, income statements, statements of change in financial position, operating statistics, and market items. The service includes 4,500 companies and 71 data items on a quarterly basis and 6,000 companies and 175 data items on an annual basis. Updated weekly from quarterly and annual reports, the Compustat database also covers utilities and telecommunications and gives summary financial data on top United States corporations arranged by geographic region.

M&A is a database providing the full details—including going price, business description, performance figures, price/earnings ratios, payment modes, and so on—of all tender offers, mergers, buyouts, and divestitures (valued at \$1 million or more) from 1979 to the present. Covering 130 items for over 10,000 deals, it's updated daily.

Exstat provides financial information on more than 3,200 British, European, Australian, and Japanese companies. It includes 327 items for British companies, 231 for non-British companies and is updated weekly from annual reports.

Bankcall contains financial information on commercial banks, including 5 years of historical data. Derived from the Federal Reserve Call Reports, it contains over 14,000 banks with over 500 items per bank; it is updated semi-annually.

Bankcompare contains over 10 years of annual data on banks and bank hold-

ing companies based on annual reports, 10K, 10Q, and call reports. It covers 280 banks and holding companies with over 800 items on each one. It's updated annually.

U.S. Economic (USECON) is a large collection of economic data on the United States economy. It contains information about daily interest rates, consumer installment debt, money stock measures, bank reserves, stock indexes by industry, mortgage market data (including HUD statistics), weekly consolidated condition report of banks by size and Federal Reserve Board district, and thrift institution assets and liabilities. It covers 25,400 time series from 1947 to the present and is updated daily from daily, weekly, monthly, quarterly, and annual reports.

Short-Term Projections (STP) and Long-Term Projections (LTP) provides forecasts of principal macroeconomic variables in the United States economy, extending 8 quarters (short-term) and 10 years (long-term) into the future. It covers 1,300 series (short-term) and 1,230 series (long-term) and is updated quarterly for short-term forecasts and semi-annually for long-term forecasts. The forecasts are produced by Townsend-Greenspan & Co., Inc., through the use of its econometric modeling systems.

Scan200 is a collection of 390 popular business indicators of the United

**THE INTERNATIONAL SECURITIES
DATABASE PROVIDES DESCRIPTIVE
INFORMATION ON OVER 26,000
SECURITIES TRADED IN THE UNITED
KINGDOM, EUROPE, AUSTRALIA, ASIA,
SOUTH AMERICA, AND AFRICA.**

States economy from 1947 to the present. It's updated daily from daily, weekly, monthly, quarterly, and annual reports.

Conference Board (CBOARD) is an exclusive historical and forecast business-related group of 1,025 time series going back to 1951. Updated daily from monthly, quarterly, and annual reporting cycles, it covers capital appropriations and expenditures, consumer buying attitudes and plans, auto sales by 10-day periods, business executives expectations, and so on.

Consumer Price Indexes (USCPI) and Producer Price Indexes (USPPI) include indexes for the cost of living for wage earners and all urban consumers from 1947 to the present and indexes for the cost of wholesale goods from 1967 to the present, respectively. Its 10,125 retail series and 6,400 wholesale series are updated monthly.

Foreign Exchange (FX) is a foreign exchange database on spot, 1-, 2-, 3-, and 6-month rates of 24 currencies, bid and asked since 1976. Covering 1,225 series, it's updated daily.

Fastock is a collection of securities and investment data on stock prices, volumes, dividends, interest payments, and put and call options. It also covers mutual funds, money markets, and corporate, municipal, and federal bonds. It includes 244 market indicators. Security prices are covered from 1971, dividends from

1968. The database also covers 97,000 securities and 244 market indicators; it is updated daily from daily, weekly, and monthly reporting cycles.

Interactive Data Corporation

The Securities Master Data Base provides securities identification information, including CUSIP number, IDC symbol, and exchange ticker with suffix, on over 53,000 North American corporate securities. SIC code, stock exchange, and security type are also included.

The PRICES Date Base includes daily prices and volume data for over 22,500 United States-traded equities and fixed-income securities, beginning in 1968. Daily price and volume data for over 1,100 Canadian equities and 57 Canadian indexes are also included. Daily prices are given for about 40 major indexes, such as the New York, American, and Toronto Stock Exchanges, plus NASDAQ, Dow Jones, Standard and Poors, and Value Line indexes.

The MASTERPRICE Data Base offers weekly bid prices for over 37,000 unlisted corporate bonds and non-NASDAQ OTC stocks, beginning in 1975.

The Split & Dividend Data Base covers daily stock splits and stock and cash dividends beginning in 1971.

The Monthly/Quarterly Data Base holds information on quarterly earnings per share, monthly shares outstanding,

and monthly holding period returns beginning in 1973.

The Municipal Bond Data Base contains descriptive information on more than 40,000 municipal issues and daily evaluations for more than 1.7 million municipal issues, beginning 1976.

The Money Market Data Base provides data, beginning in 1977, on market rates for short-term, fixed-income money market instruments and indicators.

The Commodities Data Base covers daily prices, volume, and open interest for about 90 agricultural commodities, metals, currencies, and financial futures contracts.

The I/B/E/S Summary Statistic Data Base offers earnings-per-share, 5-year growth rates, and related data for the current and fiscal year for over 2,200 companies.

The International Securities Data Base provides descriptive information on over 26,000 securities traded in the United Kingdom, Europe, Australia, Asia, South America, and Africa.

The International Bond Data Base (German Domestic Bond Data Base) holds daily prices and descriptive information on approximately 4,500 German government, railroad, corporate, regional, bank, municipal, and postal service bond issues.

Value Line Data Bases are financial databases that are similar to the Compu-stat database. —G.C.H.

PC FACT FILE

DATABASE SCREENING AND DOWNLOADING SOFTWARE

Here are the facts about the special software offered by Wharton, I.P. Sharp, IDC, and ADP to help your PC interface with their services.

DATAPATH

ADP Network Services
175 Jackson Plaza
Ann Arbor, MI 48106
(800) 521-3166

List Price: \$300, including training, but not data-access charges.

Requires: 128K RAM (256K with *I-2-3*, 512K with *Symphony*), two disk drives or one disk drive and hard disk, asynchronous communications port, Hayes 1200 Smartmodem or compatible, Lotus' *I-2-3* or *Symphony* needed to manipulate data.

CIRCLE 749 ON READER SERVICE CARD

IDCPRICE

Chase Econometrics/Interactive Data Corporation
486 Totten Pond Rd.
Waltham, MA 02154
(617) 895-4454

List Price: \$75 (data priced separately, minimum of \$50 per month).

Requires: 256K RAM, one double-sided disk drive.

CIRCLE 748 ON READER SERVICE CARD

PC SCREEN

Interactive Data Corporation
486 Totten Pond Rd.
Waltham, MA 02154
(617) 895-4199

List Price: \$750 monthly, \$8,250 annually (\$50 for each extra copy of *PC Screen* manual and diskette.)

Requires: 256K RAM, two disk drives, asynchronous communications port, modem, Lotus' *I-2-3*.

CIRCLE 747 ON READER SERVICE CARD

MICROCOMM with PLOTCOMM

I.P. Sharp Associates
Suite 1900, Exchange Tower
2 First Canadian Place
Toronto, Ontario,
Canada M5X 1E3
(416) 364-5361

List Price: \$50.00 *MICROCOMM*; \$80.00 *PLOTCOMM*.

Requires: 192K RAM, asynchronous communications adapter, full duplex modem (300 or 1200 baud), valid I.P. Sharp account number.

CIRCLE 746 ON READER SERVICE CARD

Wharton Download

Wharton Economic Forecasting Associates
3624 Science Center
Philadelphia, PA 19104
(215) 386-9000

List Price: \$3,500

Requires: 256K RAM, modem, terminal emulation package that supports disk file writing, software compatible with the DIF file format, valid Wharton account number.

CIRCLE 745 ON READER SERVICE CARD

Wharton DataDisks

Wharton Economic Forecasting Associates,
3624 Science Center
Philadelphia, PA 19104
(215) 386-9000

List Price: \$2,400 monthly, \$800 quarterly

Requires: 256K RAM, modem, terminal emulation package that supports disk file writing, software compatible with the DIF file format, valid Wharton account number.

CIRCLE 744 ON READER SERVICE CARD

able time series and the row and column references that help you locate and use each series in your *I-2-3* analyses and reporting.

DataDisks represents a comprehensive source of econometric data for IBM PC users. But, if it can't satisfy your thirst for econometric data you can supplement its

information with Wharton's Download service. Download extracts data from Wharton's mainframe computers and places it on your disks in DIF format. The

**I.P. SHARP SEEMS THE MOST
RESISTANT TO THE USE OF PCS FOR
DOWNLOADING ITS DATA. ITS
LITERATURE INDICATES THAT
THE COMPANY OFFERS NO SPECIAL
DOWNLOADING SOFTWARE AT ALL.**

data can then be read by any program that supports the DIF format.

Sharp
I.P. Sharp's *MICROCOMM* communication software package guides you through downloading data while its *PLOTCOMM* program is an "add-on" that allows you to download plot or graphics files as well as data files.

Both *MICROCOMM* and *PLOTCOMM* extract data from the Sharp commercial databases and combine it with data stored on your PC's disk. The packages also allow you to upload data from your PC for storage and analysis using Sharp's proprietary mainframe software.

Once logged on to the Sharp timesharing system using *MICROCOMM*, you can use *INFOMAGIC*, a Sharp mainframe package, to display preformatted reports on your PC's screen or printer. Another Sharp mainframe package, *MAGIC*, lets you extract data and download it to your PC in *VisiCalc* or *1-2-3* format.

PLOTCOMM lets you use Sharp's data to produce business graphics on a monitor hooked to your PC. It comes on a separate disk and has all of *MICROCOMM*'s features plus file creation and retrieval capabilities that allow your PC to use *SUPERPLOT*, a Sharp mainframe-graphics package. If you use *PLOTCOMM* with a computer that can produce graphics on the screen, you can upload and download plot files created by *SUPERPLOT*.

IDC
IDC's communications software program is designed to extract and download

data from its stock price and volume database. IDC also offers a package that contains communications, screening, and reporting software to allow you to screen its Compustat database. The first program, *IDPRICE*, accesses stock price and volume information for portfolio monitoring. The second program, *PC SCREEN*, screens the IDC financial database and the Compustat database to isolate stocks that meet your requirements.

IDCPRICE gives you access to daily and weekly high, low, and closing prices as well as volume and open interest for stocks and index options on the major exchanges. Closing prices on the New York and American exchanges are available from 1968 on.

PC SCREEN allows you to access and download data on companies on the Compustat database meeting your criteria. Compustat contains data on approximately 6,000 companies. *PC SCREEN* has on-line help messages and, from the literature provided, seems to be a capable and flexible screening tool. It produces graphs and tabular reports of the data selected during the screening process and downloads data in a format compatible with *1-2-3*.

ADP
ADP has the most sophisticated software of all. *DATAPATH*, a screening, analysis, and reporting package that includes communications software, lets you interact with and download data from any of ADP's 35 databases.

DATAPATH allows you to screen the ADP databases and download just the data you need for further analysis. It also supplies extensive preformatted reports—

called "Datapath's Application Library"—in the form of *1-2-3* templates.

You can use *DATAPATH* in either the ad-hoc retrieval mode or in batch mode. By defining the data and reports you want done and storing this batch file on your PC, you can automatically dial into the ADP timesharing service after hours—when the connect time rates are lower—and process each command submitted in the batch file. All in all, *DATAPATH* seems to be a state-of-the-art data screening and downloading package.

It is difficult to give a fair evaluation of the data downloading packages offered by these companies without actually testing the operation of the packages. But from the information provided, ADP and IDC seem to have the best offerings. Of the two, ADP's *DATAPATH* packages have a slight edge. I base this conclusion on *DATAPATH*'s added batch file processing, *1-2-3* templates, and the simplicity of using a single package. (IDC requires you to use *IDCPRICE* to access the securities pricing data base and *PC SCREEN* to access the Compustat database.)

Of the four companies, I.P. Sharp seemed the most resistant to the use of PCs for downloading its data. The company's literature indicated that it offers no special downloading software at all, which keeps Sharp out of ADP's and IDC's league.

Wharton has taken a different approach to downloading data to PCs. As far as I know, it's the only company in the country to offer extensive economic time series data on a "delivered by mail" disk. This nice service could be widely used by economists and planners who need to forecast product sales as a function of national or regional economic indicators. ■



POSTING A MESSAGE ON-LINE

These ten on-line bulletin boards represent some of the best available. They offer technical advice, free public-domain software, and even a little camaraderie via a message board.

On-line information services are perhaps the world's greatest libraries. With them you can dial up the latest news, study the population growth in China, or access statistics on virtually any subject. But if you're looking for another type of service—one that can help you out of a sticky situation and even offer a little camaraderie—you should tune into a bulletin board system.

On-line bulletin boards give computer users the opportunity to "post" messages, such as questions or solutions to common problems, and to access public-domain software, usually for a nominal fee. Each is run by a system operator, or sysop, and services vary from board to board. Here are descriptions of ten bulletin boards open to IBM PC users.

OLCTD-BIE

Whether you are new to bulletin boards or an old hand, the On-Line Computer Telephone Directory-

BBS Information Exchange (OLCTD-BIE) is a good system to know about, because it lets you know about other systems. Like many boards, the OLCTD-BIE is organized around a single subject, which, in this case, is bulletin boards.

OLCTD-BIE began as a quarterly newsletter that published a list of active bulletin boards. (The list currently numbers around 500.) Recently, publisher and sysop Jim Cambron decided to phase out the printed newsletter and provide the same information, and more, on-line.

OLCTD-BIE is about to switch to software that will let users search by key word. This means you'll be able to ask for all boards in a given telephone area code range or all those that specialize in the IBM PC, and you will receive a list tailored to your needs. In addition to the bulletin board list, the system has public-domain programs for downloading (communications programs only) and eight mes-

sage boards: BBS Information; General Question/Answer; Hardware Question/Answer; and five machine-specific message boards, including one for the PC and other MS-DOS systems. Downloading and use of the bulletin board list is limited to registered users, but anyone can use the message boards to ask questions relating to telecommunications. Registration is \$1 per month and is available for 3, 6, or 12 months. For further information, call OLCTD-BIE and choose (R)egistration from the main menu.

Phone: (913) 649-1207. Kansas City, Mo. 300/1200 baud. Parameters: No parity, 8 data bits, 1 stop bit. Uses XMODEM for downloading. Sysop: Jim Cambron. On-line 24 hours a day except for system maintenance.

Kingcomm One of the best sources of free software for the PC, Kingcomm has nearly 1,000 public-domain files that have been conveniently divided into more than 20 categories that include word processing, graphics, games, communications, Lotus' 1-2-3 programs, and dBASE II programs. One category is devoted entirely to PC-Talk III and various files, including merge files, that give PC-Talk added capabilities.

One of the first files you'll want to download here is BBS-TALK.MRG. This merge file builds on the work of Ken Nickerson's ANSIGRP.MRG and will enable PC-Talk III to receive graphics and music from Kingcomm and other boards that are running the RBBS-PC bulletin board system. If you already have BBS-TALK.MRG or a similar program, you'll

want to use it to call Kingcomm. The color graphics and sound in the sign-on message are worth seeing, but you'll probably want to bypass them after you've been through them once or twice. A subtle, but more important, benefit is the menus' use of black-and-white graphics to increase readability.

Merge files similar to BBS-TALK.MRG can be found on other bulletin boards, and some systems have an already merged version of PC-Talk III called TALKWIND. Unfortunately, some versions of TALKWIND have bugs. According to Kingcomm sysop Kent Galbraith, the bugs grew out of an inadvertent joining of one of the color/graphics merge files with an already modified PC-Talk III.

Galbraith suggests you access the BBS-TALK.MRG file and a virgin copy of PC-Talk III and do the merging yourself.

Other features on Kingcomm include the message board, a nationwide list of IBM PC bulletin boards, and a list of local Texas bulletin boards for various systems. As with many other boards, Kingcomm limits full access to registered users. Non-registered callers are allotted 10 minutes—just enough time to leave your name and phone number for registration.

The registration is free of charge; the formality is meant primarily to discourage people from leaving obnoxious messages or trying to crash the system. One hint to keep in mind when signing on to any RBBS bulletin board is that you have to hit the Return key once or twice to wake up the system.

Phone: (713) 360-1316. Kingwood, Tex. 300/450/1200 baud. Parameters: No parity, 8 data bits, 1 stop bit. Uses XMODEM for downloading. Run by Kingcomm Inc., a PC user group. Sysop: Kent Galbraith. On-line 24 hours a day except for system maintenance.



Invention Factory

Another good source for free software for the PC, the Invention Factory has roughly 400 public-domain programs. The bulk of these are classified as utility programs, including DATABASE.BAS, a database management tool; FRED.EXE, a word processor; and NEWKEY.LQR, which is listed as "Similar to Prokey." Other programs are listed under communications, graphics, games, music, tutor (educational), and personal (including a

**FOR TECHNICAL ADVICE, DEMON BBS IS
A GOOD BOARD TO CALL. ALTHOUGH IT
ISN'T SOLELY CONCERNED WITH
TECHNICAL QUESTIONS, IT HAS SECTIONS
THAT ARE MORE TECHNICALLY ORIENTED
THAN THOSE ON MOST SYSTEMS.**

spreadsheet). CROSSTALK users will be interested in the script files INV-FACBB.XTK and INV-FACBB.XTS. These are designed to automatically call and log on to the Invention Factory, but you should also find them useful as model script files for calling other systems. There is also an apparently bug-free version of TALKWIND available.

Like Kingcomm, the Invention Factory runs the RBBS-PC bulletin board software and also makes use of graphics if you have a communications program that can handle them. When you sign on, answer "yes" to the question, "Do you want graphics?" and the Invention Factory will draw an American flag on your screen, complete with blinking stars and background music (assuming that the sysop hasn't already revised the sign-on message by the time you read this). The graphics are less impressive than those featured on Kingcomm, but the benefits of increased menu readability are essentially the same.

Other features of the Invention Factory include the message board itself and a nationwide list of IBM PC bulletin boards, which is approximately 4 months old. For those living in the New York City area, the system also provides separate lists of IBM-oriented boards for all their customers with 212, 914, and 516 area codes. Full access is limited to registered users (there is no charge for registration). Non-registered users are given 20 minutes on the system.

Phone: (212) 431-1194. New York, N.Y. 300/1200 baud. Parameters: No parity, 8 data bits, 1 stop bit. Uses XMODEM for downloading. Sysop: Michael Sussell. On-line 24 hours a day except for system maintenance.

Demon BBS

If you ever need technical advice, Demon BBS is a good board to call. Most bulletin board systems serve as a meeting place for exchanging computer information, but few concentrate on technical matters like Demon BBS. This doesn't mean the board is solely concerned with technical questions, but it does have sections that are more technically oriented than those on most systems.

Demon BBS specializes in the C language and, to a lesser extent, assembly language. Sysop Danny Feinsmith stresses that the board is an appropriate source both for information about C and assembly and for downloading files written in C and assembly.

There are 13 message boards on this system, including four labeled Technical Talk, C/UNIX SIG, Assembly Language SIG, and IBM and Compatibles SIG. Less technically oriented boards include the Politix SIG, the Electronic Mail Area, and DUNGEON, an adventure SIG. Several of the technical boards are handled by cosysops, some of whom are professional programmers.

Moreover, Demon BBS is Node #8 on FidoNet, a network of roughly 35 bulletin boards, which are based mostly in California and in the Baltimore, Maryland, area. There is also one FidoNet board in England. You can exchange comments with any of the other boards by leaving your message in the FidoNet message area. You can also link files to your messages. The system automatically calls the other boards overnight when the rates are low and sends any pending mail.

Demon BBS allows full access only to

registered users, but registration is free, and the bulletin board absorbs the cost of calling other FidoNet systems.

Phone: (212) 591-4487. New York, N.Y. 300/1200 baud. Parameters: No parity, 8 data bits, 1 stop bit. Uses XMODEM for downloading. Sysop: Danny Feinsmith. On-line 24 hours a day except for system maintenance.

The Software Library

The Software Library has 16 public-access directories with over 500 downloadable programs. The system is devoted strictly to public-domain software for the IBM PC and compatibles. In addition to the programs themselves, there are text files, including, for example, explanations of the XMODEM protocol, information about the Capital PC User Group, which runs the Software Library, and lists of other IBM PC bulletin boards. There are no message boards, no question-and-answer sections, and no programs for other computer systems.

Although the system is limited to downloading and uploading, there is enough information here to overwhelm first-timers. To get a list of the 16 directories, go directly from the main menu to option 9 (XMODEM directories), then choose (H)elp from the XMODEM menu, and then (D)irectories. The directory categories include games, Lotus worksheets, communications programs, graphics programs, and several utility programs.

Also worthwhile is the text file SOFT-NEWS.000 on Directory 7. This lists approximately 30 user group library diskettes, available at \$8 each. According to sysop Rich Schinnell, only about a third of

Upgrades for better

SOFTWARE

Aptec (for color Prism Printers)	
Rainbow Writer Color Text Formatter	\$119
Rainbow Writer Screen Grabber	69
Ashton Tate	
dBase II	279
dBase III	369
Framework	369
Friday!	169
Reference Encyclopedia (book)	55
Best Programs	
Personal Finance Programs	65
PC/Professional Finance Program II	149
PC/Fixed Asset System	297
PC/Tax Cut	149
Bible Research	
THE WORD (KJV Bible - 7 disks)	145
Broderbund	
Bank Street Writer	59
Bruce & James	
WordVision	39
Continental	
Home Accountant Plus	89
FCM (filing, cataloging, & mailing)	79
UltraFile (file/report/graph)	109
The Tax Advantage	39
Digital Research	
CP/M-86	39
Dr. LOGO (requires 192k & RGB monitor)	69
Financier	
Financier II	115
Financier Tax Series	97
FriendlySoft	
FriendlyWriter (w/FriendlySpeller)	55
Funk Software	
Sideways	45
Hayes	
Smartcom II	99
Please	239
Get free mailing list template for a limited time - also get second template of your choice free from Hayes.	
Lifetree	
Volkswriter	115
Volkswriter International	135
Volkswriter Deluxe (with TextMerge)	165
Living Videotext	
ThinkTank	134
Lotus Development	
1-2-3 (version 1A)	call
Symphony	call
Micropro	
WordStar & Propek come with quick lesson	
CAI training disk and tutorial disk	
WordStar 3.3	219
Propek (WordStar/TextMerge/CorrectStar/StarIndex)	279

PC Connection Software Special through October 31, 1984

SOFTWARE PUBLISHING

PFS/Access

The first of a series of PFS telecommunications products.

- Works with the following modems:
 - Hayes Smartmodem 300, 1200, 1200B
 - Novation 103 and 103/212 Smart-Card
 - Transend PC Modem Card
 - US Robotics Password
 - Ven-Tel PC Modem Plus & others
- Included with the package are offers valued at over \$200 from The Source, Dow Jones, Western Union Easylink, MCI Mail, CompuServe & Micro Communications Magazine \$59

Microrim

- R-base 4000 \$279
- Extended Report Writer 85
- Clout 119

Microsoft

- Multiphan (ver 1.2) 135
- Financial Statement (for Multiphan) 69
- Budget Analysis (for Multiphan) 99
- Microsoft Word (ver 1.1) 239
- Microsoft Word with mouse (ver 1.1) 289
- Microsoft Project 159

Microstuf

- Crosstalk XVI 99
- Infoscope 149
- Transporter (includes Crosstalk) 169

PCSoftware

- PCcrayon II (new release) 39
- Executive Picture Show 139
- CREATABASE 47

Peter Norton

- Norton Utilities 49
- Rosetto**
- Prokey 3.0 89

Satellite Software

- WordPerfect call

Software Arts

- TK/Solver 269
- Financial Management Pack 75
- Mechanical Engineering Pack 75

Software Products

- Open Access 269

Software Publishing

- PFS/Access see special
- PFS/File 89
- PFS/Graph 89
- PFS/Write 89
- PFS/Report 79

Softword Systems

- MultiMate (ver 3.22 w/spell checker & tutorial) call

Sordim

- Supercalc 3 \$199

Virtual Combinics

- Micro Cookbook 29

- Soups & Salads (add on disk) 15

VisiCorp

- VisiCalc IV (w/StretchCalc) 149

- VisiFile 99

- VisiSchedule 129

- VisiTrend/Plot 69

- VisiWord Plus (with VisiSpell) 129

- StretchCalc (for VisiCalc) 75

Warner Software

- The Desk Organizer w/1 yr. free updates 169

TRAINING

ATI

- How to use Your IBM-PC 32

- How to use PC DOS 32

- How to use Lotus 1-2-3 (volume 1 & 2) 49

- How to use Wordstar (volume 1 & 2) 49

- How to use dBase II (volume 1 & 2) 49

- How to use EasyWriter II 49

- How to use Multiphan 49

- How to use MultiMate (volume 1 & 2) 49

- How to use Microsoft Word 49

- How to use TKISolver 49

Individual Software

- The Instructor 35

- Professor DOS 75

- Tutorial Sol (both items above) 75

- Professor Pixel 49

- Typing Instructor 37

- Scarborough Systems (was Lightning)

- Master Type 39

EDUCATIONAL

Davidson

- Speed Reader II (high school & college) 49

- Math Blaster (grades 1-6) 35

- Word Attack (grades 4-12) 35

- Additional Data Disks for other ages are available for Speed Reader II and Word Attack at \$15 each

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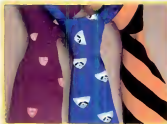
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Just call 1-800/243-8088 or 1-603/446-3383 anytime Monday through Friday 9:00 to 9:00 and Saturday to 5:30. If you're planning to visit us, call ahead to make sure what you want is in stock. The showroom closes at 8:00 M-F and 5:00 Saturday.



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The Lemon	339.
The Lime	59.
The Peach	64.
The Orange	94.

Epson

RX-80 with GRAFTRAX-Plus	call
RX-80 F/T with GRAFTRAX-Plus	call
FX-80 with GRAFTRAX-Plus	call
RX-100 with GRAFTRAX-Plus	call
FX-100 with GRAFTRAX-Plus	call
LQ-1500 (letter quality dot matrix)	call
Printer to IBM Cable (specify printer)	32.

FTG Data

Light Pen (Push Tip)	195.
Demo Disk Set for Light Pen	39.

Hayes

Smartmodem 300	209.
Smartmodem 1200	489.
Smartmodem 1200B (w/Smartcom II)	409.
Smartcom II	99.
Compucable's Smartmodem-to-IBM Cable	25.

Hercules Computer

Hercules Graphics Card (parallel port)	339.
Hercules Color Card (parallel port)	179.
Graph-X Software	42.

key tronic

Typewriter style keyboard (KB 5150)	call
Deluxe keyboard (KB 5151)	call

Koala

Koala Touch Tablet with software (connects to game port)	89.
--	-----

Kraft

Joystick	39.
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Maynard Electronics

Floppy Drive Controller	135.
Internal Hard Disk (10 Meg), WS-1 Controller & ROM for PC mother board	679.
Internal Hard Disk (10 Meg) WS-2 Controller & ROM for PC Mother Board	1079.

Mouse Systems

PC Mouse (w/software & desk pad)	149.
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NEC

Pinwriter P2(IBM) 80 col	679.
Pinwriter P3(IBM) 132 col	897.
Spirinwriter 3550 (IBM-PC compatible)	1625.
Spirinwriter 2050 (3550's little brother)	869.

Orchid Technologies

All Orchid Boards come with PCnet Drive (Ram disk), PCnet spool (print spooling), disk caching & partitioning

Blossom 64k upgradeable to 384k, with clock calendar, serial and parallel ports	259.
PCnet Daughter Board (piggybacks to Blossom) with version 2.4 networking software	call
PCnet Blossom 64k Blossom Board with the Daughter Board installed	call
Diskless Boot Rom, Cluster Kit, etc.	call

Paradise Systems

MultiDisplay Card (color & mono)	\$289
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Plantronics/Frederick

COLORPLUS (with Color Magic)	call
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Princeton Graphics

HX-12 RGB monitor (890 x 240)	call
SR-12 RGB monitor (890 x 480)	call
Scan Doubler Board (for SR-12)	call
MAX-12 Amber monochrome monitor	call

Quadram

We are a full line Quadram Dealer

New Expanded Quadboard 64k expandable to 384k, with clock calendar, parallel, serial & game port, I/O bracket, and Quadmaster software	269.
Microfazer Printer Buffer (parallel) w/copy MP 64 (64k) upgradeable to 512k	197.
Quadcolor I	197.
Quadchrome RGB Monitor	489.
Quadlink (allows you to run most Apple II programs directly on your IBM-PC or XT)	459.

SMA (Systems Management)

PC-Document Keyboard Templates available for:	
DOS/Basic 1.1	Multimate
DOS/Basic 2.0	Multiplex (IBM)
Lotus 1-2-3	Multiplex (Microsoft)
dBase II	Peechtext 5000
Easywriter II	Volkswriter Deluxe
Wordstar	(each)12

STB

Graphix Plus II (new version)	349.
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TG

Joystick	45.
USI (monitors for graphic board)	
Pi-2 Monitor (12" green, with cable)	119.
Pi-3 Monitor (12" green, with cable)	129.

DRIVES

All drives are completely pre-tested. Specify Drive A or Drive B for your PC. Comes with complete step by step installation instructions. Drives are 320k/360k.

Tandon

TM 100-2 (5 1/4") full-height drive (DS,DD)	call
FD-55B (5 1/4") half-height drive (DS,DD)	\$199.

TEAC

FD-55B (5 1/4") half-height drive (DS,DD)	169.
Free 'y' cable & bracket with each pair.	

MEMORY

Memory prices are coming down. 64K Memory Upgrade Set for IBM-PC or XT system board \$55. 64K Memory Upgrade Set for any memory board specify make of board \$55. Install memory upgrades & run diagnostics at time of board purchase only \$10.

DISKS

Verbatim (with 5 year guarantee)	
Datadisc Disks SS/DD plastic box of 10	23.
Datadisc Disks DS/DD plastic box of 10	33.
Disk Drive Analyzer	22.
Flip Sort (holds 75 disks)	19.

INFORMATION SERVICES

Compuserve

Compuserve Information Service (includes subscription, manual, 5 hours of connect time, monthly publications)	29.
Executive Information Service	79.
Vidtext Software	59.
Executive Information Service with vidtext	119.
Source Telecomputing The Source (subscription & manual)	49.
The Source with SourceLink Software	59.

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Over at Jr. CONNECTION, our consultants are pretty enthusiastic about IBM's relaunch of its not-so-pretty-afirst baby. New keyboard. Expanded memory potential. Admittedly, it's stuff we've been offering from non-IBM sources for months now. But the exciting thing is that IBM's new commitment will translate into a greater variety of hardware and software from third

party vendors.

If you own a jr, or are thinking about getting one, our jr. specialists can answer your questions and give you the latest product information. For your PC and XT, keep calling PC CONNECTION. For your PCjr., call Jr. CONNECTION - exclusively for the IBM-PCjr.

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2. Insert this sheet with
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3. Slice the folded edge
4. Close the page and slip-sheet



Folded edge of the page

Foldout slip-sheet

1. Open the foldout page
2. Insert this sheet with
 1. Front side touching the free page
 2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet



1. Follow instructions on the other side

Inverted Back



Obs5ipBack-0018

Back

1. Follow instructions on the other side

grades; enhancements

Most Amazing Thing (ages 10 & up)	\$27.
Face Maker (ages 3 to 8)	23
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Kinder Comp (ages 3 to 8)	20
Rhymes and Riddles (ages 5 to 9)	20
Hey Diddle Diddle (ages 3 to 10)	20
Alphabet Zoo (ages 3 to 8)	20
Stones (requires graphics board)	
Great graphics and sound	
My Letters, Numbers, Words (ages 1 to 5)	29
Kids Stuff (ages 3 to 8)	29
Across the U.S.A. (ages 5 & up)	22

GAMES

AtariSoft	
Centipede	29
Pac Man	29
Dig Dug	29
Defender	29
Donkey Kong	29
StarGate	29
Robotron	29
Blue Chip	
Millionaire	45
EPYX/Automated Simulations	
Temple of Aposha	27
Upper Reaches of Aposha	15
Curse of Ra	15
Star Warrior	27
Rescue at Rigel	23
FriendlySoft	
FriendlyWare/PC Arcade	35
Funtastic	
Snack Attack II (a favorite)	27
Cosmic Crusader (as good as above)	27
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Infocom High quality text games	
Zork I, Zork II, Zork III	each 27.
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Deadline	27
Suspended	35
Witness	35
Planetfall	35
Enchanter	35
Infidel	35
Sorcerer	35
Seastalker	27
Microsoft	
Flight Simulator (new version)	35
Orion	
J-Bird (you'll never sleep)	29
PC-Man	25
Paratrooper	25
Pits & Stones	29
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Armchair Quarterback	27.

PC Connection Hardware Special

through October 31, 1984

CURTIS MANUFACTURING Surge Protectors

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- Sapphire (similar to EPD Peach) 55
- Ruby (similar to EPD Orange) . 65

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Wizardry	42
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Frogger	27.
Crossfire (keyboard or joystick)	23
Ulysses and the Golden Fleece	27.
Strategic Simulations	
The Warp Factor	27.
Tigers in the Snow	27.
Galectic Gladiator	25
Epidemic	25
Sublogic	
Night Mission Pinball	29

HARDWARE

AST Research (For IBM-PC or XT)

All AST Boards come with SuperDrive, SuperSpool, and one year warranty.	
SixPakPlus 64k upgradeable to 384k, with clock calendar, serial and parallel ports (game port optional)	269
MegaPlus II 64k upgradeable to 256k (or more with MegaPak) with clock calendar and serial port (parallel, game, or second serial port optional)	269
MegaPak 128k (not upgradeable) call MegaPak 256k call	
I/O Plus II with clock calendar and serial port (parallel, game, or second serial port optional)	129.
Parallel, Game, or second Serial Port (for any AST board (specify board)	39.
Connectall connector bracket (PC only) 19.	
AST-5251	559
AST-3780	649
MonographPlus with clock calendar, serial & parallel ports	429

Amdek

Video 300G monitor (green)	139
Video 300A monitor (amber)	149
Video 310A monitor (amber)	179

Compucable

Plastic Keyboard & Drive Cover Set	17.
IBM Mono Screen Enhancement	17.
Printer to IBM Cable (specify printer)	32
Smartmodem to IBM Cable	25.

Curtis

STANDS	
PC Pedestal (for IBM Mono or Color)	39
PGS or Quadchrome Adapter for above	9
Low Profile Tilt and Swivel Pedestal	39
System Stand	21.

CABLES

Extension Cables for IBM Mono Display	39
Keyboard Extension Cable (3 to 9 feet)	29
AC Plug Adapter (any monitor to your PC)	8

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the programs from the library disks are available on the system. Directory 3 has a text file, CAPITAL.PC (Capital PC User Group Information), with information on how to order the disks. Hint: The password to get on this system is IBMPC. There is no registration.

Phone: (301) 949-8848. Rockville, Md. 300/1200 baud. Parameters: No parity, 8 data bits, 1 stop bit. Uses XMODEM for downloading. Sysop: Rich Schinnell. Run by Capital PC User Group Inc. On-line 24 hours a day except for system maintenance.

ECLECTIC IBM BBS

This RBBS-PC-based system has less on it than the other bulletin boards listed here, but ECLECTIC IBM BBS places a greater emphasis on graphics and music than most. Of particular interest is the section labeled On-line Color/Music Demos. You can find a larger number of such programs on other systems but not grouped into their own category. These demonstration programs hint at interesting possibilities for graphics-oriented bulletin boards in the near future and are worth viewing. The two largest categories of programs for downloading are Color/Graphics Games and Demos and Monochrome Games and Music. However, there are only about 70 programs in each category. Still, this bulletin board is worth a look. Registration is not required.

Phone: (914) 221-2248. Hopewell Junction, N.Y. 300/1200 baud. Parameters: No parity, 8 data bits, 1 stop bit. Uses XMODEM for downloading. Sysop: Deitrich Jaeger. On-line 24 hours a day except for system maintenance.

Larry Jordan's RBBS-PC

As you might guess from the name, the sysop on this board is Larry Jordan, who is a communications and database management systems consultant. He also coauthored *Communications and Networking for the IBM PC* (R.J. Brady, 1983) with Bruce Churchill and wrote the upcoming *IBM PCjr Communications* (R.J. Brady). Not surprisingly, Larry Jordan's RBBS-PC concentrates on communications, especially on communications with the IBM PC. In other words, if you're looking for a place to learn the finer points of communications or to keep up with technical changes as they occur, this is a good board for you to access on a regular basis.

For example, if you'd like to learn about the XMODEM protocol or Kermit protocol, you will find bulletins that explain them. These are highly readable article-length explanations, both written by Jordan. In addition, the message section is filled with useful nuggets of information about communications and has a much lower percentage of idle chitchat than most other boards.

Five of the ten active sections for downloading programs deal with communication programs. PC-Talk III files, RBBS-PC files, Kermit protocol files, communications utilities, and BBS Source Code in C all have their own sections. Games, general-purpose utilities, and other programs are here, but they're underrepresented. And, of course, there is a list of other IBM PC bulletin boards nationwide. There is no registration.

Phone: (301) 251-6293. Gaithersburg, Md. 300/450/1200 baud. Parameters: No



parity, 8 data bits, 1 stop bit. Uses XMODEM for downloading. Kermit protocol should also be available for use in downloading in the fall of 1984. Sysop: Larry Jordan. On-line 24 hours a day except for system maintenance.

The Fargo Board

This RBBS-PC-based system, operated by the Fargo IBM Personal Computer User Group RBBS, has opted not to use any of the graphics functions of RBBS software in favor of maintaining total compatibility with the maximum number of communications programs. The only place this makes a real difference is in the appearance of the menus, which are marginally less readable than those from other RBBS systems.

The Fargo board currently has roughly 900 downloadable files, with more being added daily. These are grouped in about 20 categories, including communications, word processing, database management

**SYSP Loren D. Jones Prefers To
Keep Discussion in the Message
Area Focused on Serious,
Computer-Related Subjects. All
New Users Must Read "The Ten
Commandments of Using This
Bulletin Board."**

programs, educational programs, games, and six different utility programs. Obviously, this board is not organized around any particular topic. Still, sysop Loren D. Jones discourages personal or frivolous messages and prefers to keep discussion in the message area focused on serious, computer-related subjects. All new users are directed to read a bulletin called "The ten commandments of using this bulletin board."

As with many other bulletin board systems, the Fargo PC User Group board requires registration in order to gain full access. There is no charge for registration, but be prepared to enter your name, phone number, and address as soon as you sign on. Unregistered users are given only 15 minutes and have no downloading privileges.

Phone: (701) 293-5973. Fargo, N.D. 300/450/1200 baud. Parameters: No parity, 8 data bits, 1 stop bit. Uses XMODEM for downloading. Sysop: Loren D. Jones. On-line 24 hours a day except for system maintenance.

IBM PC Information Exchange

The IBM PC Information Exchange of Northwest Chicago is extremely popular and is hard to access—despite the fact that it has two public-access phone lines plus a third that is reserved for significant contributors to the system. Moreover, once unregistered users get past the busy signals, they are given 10 minutes. At 300 baud, this is just enough time to read the registration information, which tells you to send your name, mailing address, telephone number, and self-addressed

stamped envelope to Gene Plantz, P.O. Box 95638, Hoffman Estates, IL 60195. Sysop Plantz will then send you a password.

This is an unusual requirement for registration and has caused a debate in the BBS community. Plantz maintains that the mail registration is important because it is the only way to protect the board from would-be system crashers and other objectionable types.

As a registered user, you will find about 700 downloadable programs on the IBM PC information exchange system. These are listed "last-in, first-out" so you can ask for new files and get a list of only those that have been added since you last called. You can also search by filename or by descriptive key word. The list and search functions can be applied either to the entire program library or to any of six specific categories, including programs, unprotected, word processing, games, system utilities, and telecommunications. The search function allows for partial matches, so you can search for a file even if you're vague on the filename. Usually, the first two or three letters are enough.

Other features on the system include a nationwide list of IBM-oriented systems and a technically inclined message board. You can also search the message board by key word as entered in the To, From, and Subject fields. There is no charge for registration beyond the cost of stamp and stationery.

Phone: (312) 882-4227. (If this is busy, the call will automatically be transferred to the second line.) Chicago, Ill. 300/450/1200 baud. Parameters: No parity, 8 data bits, 1 stop bit. Uses XMODEM for downloading. Sysop: Gene Plantz. On-line 24

hours a day except for system maintenance.

ircomm

Aircomm is a good system if you're interested in bulletin boards—especially if you're thinking of setting up your own RBBS system. Sysop Jon Martin develops RBBS-PC bulletin board software. You will find bulletins on bugs (and fixes) in both RBBS software and *PC-Talk III* merge files. The message section focuses on computer-related topics, particularly on communications, and occasionally on technical issues.

While Aircomm is a good source for answers to communications questions and problems, only two of the nearly 500 files available overall in 16 categories deal primarily with communications. One is devoted to *PC-Talk* files and the other to RBBS files. Other categories include assembler source code, programming aids, utilities, Pascal, C language programs, database programs (*PC-File*), spreadsheet utilities, word processing utilities, educational programs, financial programs, graphics, music, and even games, one of the larger categories, with more than 60 entries.

Other features include a local (California) BBS list and a nationwide list of PC-related boards. There is no registration.

Phone: (415) 689-2090. Concord, Calif. 300/450/1200 baud. Parameters: No parity, 8 data bits, 1 stop bit. Uses XMODEM for downloading. Sysop: Jon Martin. Owned and operated by Advanced Information Management Inc. On-line 24 hours a day except for system maintenance. ■

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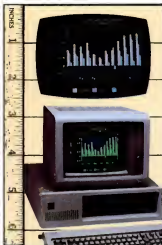
Or buy a color card and color monitor for graphics. (Lotus™ 1-2-3,™ for example, uses lots of graphics, as well as text.)

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Here's how we've measurably eased your job of choosing the best video display (saving you a lot of money in the process).

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The Paradise Modular Graphics Card™ gives you *full screen, 16-shade* graphics on *any* display, including IBM's high-resolution monochrome monitor.

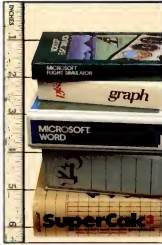
IBM's color/graphics card can display 16 colors on a color monitor.

So can the Paradise Modular Graphics Card.

But that's where the similarity ends. When you use color/graphics software with the Paradise Modular Graphics Card and a monochrome monitor, it translates those colors into a true 16-shade gray scale. With full screen display, flicker-free scrolling and clear, crisp character sets (like those of IBM) in all modes.

Naturally, the best video card fits either the IBM PC or XT, and works with any monitor you choose: IBM monochrome (or equivalent), RGB or composite video.

2. Measure software compatibility.



Many video cards only work with specially modified software. The Paradise Modular Graphics Card runs popular off-the-shelf color/graphics software on your choice of monitors. *Unmodified.*

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sacrifice off-the-shelf software compatibility.

Paradise doesn't want you to compromise.

Of course the Paradise Modular Graphics Card runs Lotus 1-2-3 graphics on an IBM monochrome monitor.

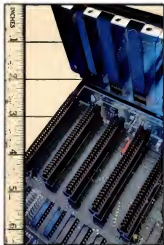
But it also runs almost all unmodified off-the-shelf color/graphics software.

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A menu-driven software system—with a user interface much like that of Lotus 1-2-3—lets you take advantage of all the Paradise Modular Graphics Card's features.

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You need to worry about slots for future expansion. Since you *must* use

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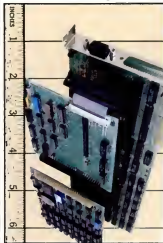
a slot for video support, why not pack it with more functions?

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TRICKS OF THE ON-LINE TRADE

These tips on navigating through six popular on-line systems can help you get the most out of them.

Learning to make the most of an on-line database system is a lot like learning to master DOS. The manuals the popular services supply often include excellent explanations of individual features and commands but very little connective tissue to show you how to use these tools to accomplish your goal.

Each on-line service has its strengths, weaknesses, and general "personality." Each also has its little tricks, special files, and features tucked away in obscure electronic nooks and crannies. You usually discover these quirks only after spending many hours (and many dollars) on a system.

There's no substitute for experi-

ence, but perhaps this discussion of the tricks, techniques, and little-known features of six popular on-line systems can help you get the most out of them. But first, some general tips.

If you're interested in tapping the electronic information reservoir, you'll find some techniques are basic no matter what on-line system you're using.

1. Buy yourself a 1200-baud autodial modem and software to support it. The added convenience is more than worth the extra cost.

2. Take full advantage of any automatic sign-on features or script files offered by your communications software. Read the manual, and learn how to use those portions

of the program. These features make it easy to access a database, and they free you to think about other things.

If your communications program doesn't support macros, consider using a product like *ProKey* or *SmartKey* to load frequently used database commands and search strings into single keys. (Be sure the program is compatible with your communications package before you buy.) Macros will save you literally hundreds of keystrokes. Equally important, they will reduce the amount of time and money you waste with inaccurately typed commands.

3. When you're first learning a system, use it at 300 baud. You'll inevitably

make mistakes, and there's no point in paying a 1200-baud premium rate to do so. When you're ready to do some serious downloading, switch to 1200 baud since it is usually more cost effective. But don't try to read the stuff while you're on-line. Instead, save the entire session to disk for later reading after you've signed off.

4. Generally, it is best to sign on as late at night (or early in the morning) as possible. During peak hours, the response time of most systems markedly deteriorates. Nothing is more frustrating than waiting 5 minutes for a response from the system—particularly when you're being charged for every second.

5. Try to be as familiar as possible with the printed versions of the publications you plan to search. *Time*, *Business Week*, and *Institutional Investor* may each carry a story about the Third World debt crisis, but each will cover it from a different angle. The more you know about a publication's printed version, the easier it will be to find the information you want in its electronic version.

6. Make sure you get all the available manuals and documentation for a database or an information source. Check the documentation that comes with your subscription for any references to supplemental manuals, and watch for any on-line announcements of new or revised instructions.

When the system you're using enables you to access information supplied by some other firm, consider contacting that firm for brochures, manuals, and newsletters that can make it easier to use the database.

7. Plan your search before you pick up the phone. Preplanning is undoubtedly the

single most effective way to hold down on-line search costs. Naturally, you can't anticipate everything you'll encounter once you start searching. But if you take a moment to think about the database or feature most likely to hold the information you seek, then review the commands for using that feature and jot down some of the keywords and search arguments you plan to enter, you'll get much better results.

8. You won't always get everything you want, but you'll probably get most of what you need. With the exception of news, stock quotes, and the like, a good deal of the very latest information on a topic may not yet be on-line when you conduct your search. Fortunately, thanks to increased office automation, this lag is gradually shortening. But the sheer volume of information and the amount of processing required to put it on a system can still cause delays of anywhere from several weeks to several months. On the other hand, an on-line search will almost always yield something you can use, and even professional researchers don't bat 1,000 every time.

9. Plan to spend a certain amount of time and money practicing. It's fun to jump right in and get your feet wet. But like the PC, an on-line system is a powerful tool that you'll need time to learn. If you want to be able to get facts or figures quickly when you're under some future deadline, you have to hone your skills before that need arises.

10. Use your imagination. Searching for information is, and always will be, a creative art calling for as much inspiration as the most elegant program. You don't have to know all a system's commands or information files. But if you have a gen-



**CIS IS THE WORLD'S LEADING
INTERACTIVE VIDEOTEXT SYSTEM. THE
COMPANY IS ADDING CAPACITY SO FAST
THAT YOU CAN ALMOST HEAR THE
HAMMERS IN THE BACKGROUND WHEN
YOU CALL ITS CUSTOMER SERVICE NUMBER.**

eral idea of what those commands can do and the kind of information the system contains, your brain will be well equipped to come up with imaginative solutions to your information needs.

COMPUSERVE: THE LEADER

With over 140,000 subscribers, the CompuServe Information Service (CIS) is the world's leading interactive videotext system. The company is adding capacity so fast that you can almost hear the hammers and saws in the background when you call its customer service number. Yet nothing so marks CompuServe's evolution from its modest, hobbyist origins in 1979 as its recent elimination of the user programming facilities that the system has always been known for. Today, it is no longer possible to write and run programs on the CIS DEC mainframes. The erstwhile "programming area" is now used strictly for file storage.

Almost. As it happens, there is one user-created program still on the system that virtually no one knows about. Written by CHRISDOS, the system operator of the CB Users Special Interest Group, the program is called `USR:MU.EXE`, and it has the more or less unofficial blessing of the CIS powers that be. `MU.EXE` is a vestige of the days when inspired programmers created powerful command files that automated their entire CIS sessions. The trouble was that a few individuals abused the privilege and wrote programs to raid the accounts, files, and what-have-you of

unsuspecting subscribers. Hence, no more programming.

`MU` is different, and it's definitely worth trying. When run, it presents a menu of some 40 CompuServe special interest groups (SIGs). But it also displays the headers of any electronic mail you may have waiting. You can also use it to automatically format the system's output to your terminal, suppress system menus, and automatically assign yourself a CB handle.

You'll find the documentation for this program in Access, CompuServe's file-sharing facility. Key in `GO PCS-46` to get to Access; then key in `R MUDOC.80` to read the file. In case the documentation has not been updated, you should know that you don't need to copy the program `MU.SAV` from Access into your filing area.

To run `MU`, key in `PRO` at any CIS exclamation prompt. This command will take you to the programming area. When you see the "OK" prompt, key in `R MU` to request and run the program. You can always get back to the CIS menus from the OK prompt by keying in `R DISPLAY`.

Another feature most users aren't aware of is the option to create a personalized menu that will replace the standard CIS menu each time you sign on. Beginning with User Information on the main CIS menu, wend your way through Terminal Defaults to a menu called Setting Your Logon Actions. That selection will give you a chance to Create/Edit Your Personal Menu. You'll be asked to specify up to ten CIS page numbers and to key in a single-line description for each one. (To finish at any point, just hit Enter at the prompt.) The menu you create here will

greet you the next time you sign on to the system.

Because CompuServe is constantly adding new features, it is a good idea for both experienced and novice users to periodically download the system's index. This index will give you an alphabetical list of features and the CIS page numbers that will let you access them immediately. Key in `GO IND1` at any prompt, then opt for all of the indexed topics.

Here's an important tip you should know about. After displaying every 13 features, the system will pause and prompt you for a number or to press Enter for more choices. Nothing is mentioned about eliminating the pause and prompt, but you can do so if you key in `S` instead of a number or just press Enter when the prompt first appears. This move will save you a lot of word processing later and produce a clean, continuous list. The transmission takes only 2 to 3 minutes at 1200 baud.

Don't leave the index when the complete listing is finished. Instead, return to the main index menu and opt to search for topics of interest. When prompted for a key word, enter SIG. This command will give you an alphabetized list of all the special interest groups on the system, making it easy to enter any of them. As I will explain later, there are many reasons why you would want such a list.



CompuServe Information Service
5000 Arlington Center Blvd.
Columbus, OH 43220
(614) 457-8600

CIRCLE 741 ON READER SERVICE CARD

CompuServe is similar to The Source in the facilities it offers, and the two can be used in similar ways. But there are some important differences. The computerized conferencing facilities on CompuServe can't hold a candle to The Source's Participate facility, and no one with any sense would maintain that CompuServe's E-Mail electronic mail system is anything but cumbersome and crude. (Most users remain unaware of its single-message length restriction until they try to send a letter containing more than the equivalent of 50 lines of 80 characters each, E-Mail's upper limit.)

But CompuServe has something that neither The Source nor any other system yet rivals: More than 50 special interest groups. It is no exaggeration to say that the SIGs alone are worth whatever effort and money it costs you to get a CompuServe

istry, CP/M, the p-System, environmental issues, art, music, education, religion, space, sports, ham radio, working at home, and more. These groups attract people from all over the country, many of whom are experts in their chosen fields. Unless you're an expert yourself, you can bet that you'd never "meet" them any other way.

If you want to tap this resource, that indexed listing of the CompuServe SIGs is important. The SIG manual (*SIG/Forum Instruction Guide*), available through CompuServe, is also a necessity. The cost is \$3.95, and you can place your order on-line by keying in GO CIS-54 or by selecting User Information from the main CIS menu.

It is also a good idea to learn to search for and place notices on BULLET (GO HOM-30), the main CIS bulletin board. You should take advantage of the CIS User Directory (GO HOM-4) to search for individuals by their specified interests. These facilities can be used to locate individuals likely to have the expertise you seek. You can then contact them via E-Mail.

If you're a new user, be sure to enter your official sign-up information (credit card number, address, and so on) as soon as possible. (The system will prompt you to do so each time you sign on during your initial "free" time.) Unlike The Source, CompuServe does not force its subscribers to pay a monthly minimum, so it costs you nothing to become a full-fledged CIS user.

Indeed, you will not be able to receive electronic mail until you achieve this status. In addition, the sooner you sign up, the sooner you'll start receiving *Today*,

the slick CIS magazine, and *Update*, the newsletter that announces new CompuServe features. There is no charge for either publication.

Remember, however, that a surcharge will be added to your bill if you access the system on anything other than the CompuServe Network, the company's own packet switching system. If there is no CompuServe number in your locality, you may have no choice but to use Telenet or Tymnet. But CIS is constantly adding additional numbers, so it can be very worthwhile to check the list periodically. Key in GO LOG-50 to start a program that will let you search by area code or state abbreviation.

Finally, under no circumstances should you ever key in your password after you have logged onto the system. Sad to say, unscrupulous CIS users have tricked a number of people into supplying their passwords and then have run up huge bills charged to the unsuspecting user's account. The scam typically works like this: The victim is happily using CB or the CB-like conferencing facility in one of the SIGs and suddenly receives a message saying that there is a "Communications problem on the network." This message will usually be followed by an official-looking prompt for the user's ID, followed by a similar prompt for the associated password. The "prompts," of course, come from the thief.

So be warned: The CompuServe system never prompts you for your ID and password after your initial sign-on. If you receive a request like that, turn your printer on or open your capture buffer to record your session. Enter /UST to generate a list of account numbers for people currently

CompuServe

subscription. The SIGs are best described as on-line user groups and clubs. The messaging/bulletin board facilities each offers are an ideal way to query members on some problem or to seek advice and expertise. And the databases each SIG maintains (key in XA at the menu prompt once you've entered a SIG) contain a wealth of information.

The vast majority of SIGs can be "joined" free of charge. And as you might expect, there is a SIG for virtually every brand of computer. (To enter the IBM PC SIG, key in GO PCS-131.) But some SIGs also focus on medicine, den-

**WITH IMAGINATION AND A MODICUM
OF SKILL, YOU CAN WELD THE SOURCE'S
MANY PIECES TOGETHER INTO AN
INFORMATION-SEEKING JUGGERNAUT
THAT IS VIRTUALLY CERTAIN TO TRACK
DOWN WHATEVER YOU'RE LOOKING
FOR.**

using the CB system. (One of them will be the thief.) Then be sure to report the incident immediately to CompuServe Customer Service. CompuServe maintains certain system logs that may make it possible to identify the miscreant and result in the individual being permanently barred from the system.

THE SOURCE: INFORMATION THROUGH SYNERGY

The key to maximizing the information retrieval and other possibilities offered by The Source is synergy. With a little imagination and a modicum of skill, you can weld the system's many individual pieces together into an information-seeking juggernaut that is virtually certain to track down whatever you're looking for.

Though it cannot rival the breadth and depth of a service like DIALOG or BRS, the system offers a great deal of information likely to be of interest to the average person, particularly the average businessperson. But, like CompuServe, The Source offers something that the information giants do not: convenient access to other people, many of whom are likely to have the expertise, experience, and knowledge you seek.

Someone trained in using information-only systems could easily overlook this benefit, but the people you can reach on The Source constitute a resource at least as important as the service's collection of tra-

ditional information files. In fact, sometimes a fellow Source user will be able to supply facts, figures, and insights that have not yet made their way into the traditional on-line information channels. Those traditional channels are explained in *The Source Manual*. Here we'll focus on the synergy made possible by the combined use of the system's superb communications features.

The first thing to do when you're looking for something is to post a notice (using the POST command) on the system's bulletin board. As The Source manual points out, categories range from Antiques to Zenith. Notices may be up to 23 lines long, and they remain on the system for 14 days before they are automatically purged.

Although many categories may apply to your quest, generally it is not a good idea to post notices in more than four categories at any one time. Source users typically scan all categories to see what's new since they last signed on, and the subject line for each of the notices you've posted then appears on their screens. Although most Source users are quite willing to help others, forcing people to sit there while the same subject line scrolls up their screens again and again is not likely to create a generous frame of mind.

Make a special effort to be polite in phrasing your request. Remember, you're asking someone to take the time to give you an answer, and on-line time is money. Be sure to include a line like "Please contact me via SMAIL at TCA123" to save the reader from combing through the header for your account number. Note that there's an undocumented command for posting notices: when you are creating

your message, you can use .LOAD FILENAME to transfer a file from your personal filing cabinet to the bulletin board. See the manual's explanation of SourceMail for more information on this technique.

The next step is to use the MEMBERS command to locate users who have voluntarily listed themselves in The Source's directory. This command isn't in the manual either, but it lets you locate members by user ID, name, city, state, country, occupation, personal computer used, or stated interests. At last count, the directory contained nearly 4,000 entries, and more will certainly add their names as they discover this command. You'll find it on the Mail and Communications menu. Or you can type QUIT to get to The Source's Command Level, then type MEMBERS. (Note to experienced Source users: This feature is much faster than the DISSEARCH command that it replaced.) When you locate people who may be able to help, send them a polite request through SourceMail.

Participate, the computerized conferencing system available on The Source, is another rich mine of information and expertise. Here you'll meet magazine editors and columnists, scientists, college professors, technical specialists, computer hobbyists, and lots of other interesting,



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knowledgeable people. You'll find ongoing on-line discussions or conferences on various topics that you might enter by typing any of the following: "CRT ERGONOMICS", "L-5 SPACE SETTLEMENT", "ARCHITECTURE", "COMPUTERS & LAWYERS", and "CAD/CAE". There's also a "FILM PRODUCTION NET", an "AIDS INFORMATION NETWORK", and, of course, a conference on the "IBM PC".

Many of these conferences have been active for some time, and you can read all of the queries, comments, responses, and information that individuals have uploaded from the start. Equally important, you can use Participate to upload questions of your own or send personal messages to individuals whose remarks bear on your quest.

You access Participate by typing PARTICIPATE at the Command Level or by following the menus. Then enter PROFILE "PARTICIPATE" CONTENTS for a list of the major conferences on the system. When you find

a conference of interest, enter PROFILE "CONFERENCE-NAME" CONTENTS to see the names of any additional subconferences that may have grown out of it.

It would also be a mistake to overlook Public, the user publishing section of The Source. You'll find the artificial intelligence network (AINETWORK) at PUBLIC 119, a magazine about using computers in education (ONLINE EDUCATOR) at PUBLIC 157, and NEWSBYTES (sort of an electronic *InfoWorld*) at PUBLIC 155. Tom Kashuba's *REAL TIMES* magazine (PUBLIC 111), featuring columns by Larry Magid, is also must reading for any IBM owner.

There is at least one command not covered in the manual that I feel is crucial: the option of entering the NOCRT command at most-MORE- prompts. (NOSCROLL will also work.) If you plan to capture everything to disk and read it off-line, or if you want to do other things during a long download, you do not want the system to pause after every 24 lines. If you enter NOCRT at the first-MORE- prompt, the system will come back with another-MORE- prompt. At that point, hit a carriage return, and the scroll out will continue uninterrupted.

It's nice to use the CHAT command on The Source now and then, but few things are more disruptive to an information search than seeing "CHAT from TCA123" appear in the middle of an important printout. If you don't enter CHAT OFF (there's a space before the hyphen) at the Command Level, however, anyone on the system can send you this query. (Many chatters use the ONLINE command to get a list of the account numbers of users currently on-line and then

enter CHAT at random.)

It can also be helpful to know about the DATE and TIME commands. Entered at the Command Level, DATE will give you both today's date and the current time of day (31 Oct 84 15:39:48 Wednesday). If

THE SOURCE
AMERICA'S INFORMATION UTILITY

you are a victim of information overload, this command offers a convenient way to date stamp files that you may not review until months later.

The TIME command is also useful, particularly if you are trying to keep your monthly on-line charges in the low six figures. It's also useful if you plan to bill a client for the time you spend on-line. The TIME command will tell you how many hours and minutes you have spent on the system since signing on (time used: 00h 12m connect).

Without a doubt, two of the most powerful but least used features of The Source are SID and CO files. Both are batch command files of the sort you might create with PC-DOS. The difference is that an SID file is like an AUTOEXEC.BAT file: it begins running the moment you sign on, and there can be only one per Source ID. However, just as you can have any number of BAT files on a disk, you can have any number of CO (Command) files in your Source filing cabinet.

Here are an SID file and a CO file everyone should consider. They're easy to create, and they can save you both time and money. Get to the Command Level (type QUIT at any menu prompt) and key



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FINANCIAL INFORMATION. IF YOU'RE
SERIOUS ABOUT YOUR INVESTMENTS,
YOU CAN'T AFFORD TO BE WITHOUT IT.
AND THE DJN/R SOFTWARE HELPS YOU
GET THE MOST OUT OF THE SERVICE.**

in ENTER SID. When the "Enter text" prompt appears, key in:

```
CHAT -OFF
MAIL READ
Q
MENU
```

Close the file by hitting two carriage returns in a row.

This file will turn the Chat facility off the moment you sign on. It will display any letters in your mailbox and exit SourceMail when finished (or if your mailbox is empty). Then it will return you to The Source's main menu.

The following CO file is even more crucial because of an "undocumented feature" (or bug) in the system. If you are ever knocked off-line or if for one reason or another you fail to exit a Source program properly, the system tries to save as much as it can of whatever you have been doing. The saved text is stored in your personal filing cabinet under a TS (for "temporary") filename, and from that moment on, you begin paying storage charges for it. (If the same thing should happen to you in the Participate facility, the filename will be of the form: PARTI-NAMESSTP.)

If you've been puzzled by what appear to be unwarranted storage charges on your Source statement, sign on, get to the Command Level, and enter FILES to see if some of these "tee-dollars" are eating up your real dollars. You can delete these files at any time, but you have to remember to do so.

Fortunately, there's an easier way. At the Command Level, key in: ENTER OFF. Then key in the following:
DELETE TS0000

```
DELETE TS0001
DATE
TIME
OFF
```

Close the file by hitting two carriage returns.

When you next conclude an on-line Source session, enter CO OFF at the Command Level to run this command file. The file will delete the TS files cited if they exist, give you the date and time, the hours and minutes you've spent on the system, and log you off. (The first temporary file saved is always labeled TS0000; others follow in succession. The number of delete commands you enter in your CO file is up to you.)

DOW JONES NEWS/ RETRIEVAL: ESSENTIAL FOR INVESTORS

The best way to use the Dow Jones News/Retrieval service (DJN/R) is not to use it at all. Instead, let Dow Jones IBM PC software use it for you. Dow Jones is the unquestioned leader in on-line financial information. If you're serious about your investments, you really can't afford to be without it. Using the Dow Jones software is the quickest, easiest way to get the most out of the service.

Virtually all DJN/R packages for the

PC, including the *Market Microscope*, the *Market Manager*, the *Spreadsheet Link*, and the *Market Analyzer*, can automatically sign on (with the help of an autodial modem) to the system and fetch the information you need (see "Sticking to Fundamentals," PC, Volume 3 Number 13). Once you get a package set up, you can update your portfolio or obtain the latest quotes almost at the push of a single key. Where the products differ is in how they can manipulate the information after you are off-line.

If you do not use one of the DJN/R programs or if you are signing on to take advantage of the sports, movie review, Comp-U-Store, MCI Mail, or other services, you may be in for a mildly unpleasant surprise. Compared to most other on-line systems, the software that runs DJN/R system can only be described as crude.

For example, the system does not prompt you to hit Enter if you want to continue. It simply stops after displaying a certain number of lines. If you're accustomed to the prompts of more friendly systems, you may wonder what's wrong. DJN/R does not recognize a break signal, and it doesn't support the X-ON/X-OFF flow control protocol that allows you to stop and start the on-screen scroll. There is no way to adjust the width or length of



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incoming information. And the system regularly sends a series of low ASCII codes that add clutter to your screen.

These deficiencies by no means make the service unworkable—as the 150,000 subscribers DJN/R has attracted can attest. But they are, in effect, the bad news. The good news is that you can do something to counteract almost all of them.

First, many DJN/R databases are formatted into pages containing 14 lines of 32 characters each. Typically, each page begins with a header indicating its number and how many other pages there are in the file. If you want to read the whole file without having to hit the Enter key at the end of each page, simply fire off as many Enters as there are remaining pages at your first opportunity. Do it quickly so that you don't interfere with the format of the next line.

If you access the service via Tymnet, you can simulate a break signal by pressing Ctrl-X. This command will interrupt the flow of information to your PC and drop you at a spot where you can enter another DJN/R command or move to a different database. The only exception is the Text database, in which you must wait until everything you have requested has been transmitted.

The Ctrl-X key combination does not work with Telenet, but something else does. When you enter the terminal identifier D1, you automatically enable Telenet's own flow control system, which allows you to stop a DJN/R scroll by typing Ctrl-S and start it up again by typing Ctrl-Q. Since DJN/R does not support this standard on-line feature, text continues to flow from the service to Telenet. But Tele-



net immediately begins storing it in a series of buffers. The capacity of these buffers totals about 5,760 characters or about a dozen typical DJN/R pages.

You can't do anything about the width and length of DJN/R pages. Some are formatted for 32 characters, some for 60, and some for 80, depending on the database. Under these circumstances if you need a good-looking printout, your word processing software is your best bet.

But there is something you can do about the low ASCII codes and strange characters they produce on your screen. You need two things: a communications program that can filter out selected incoming codes (characters) and a list of the codes to get rid of. The communications program is up to you, but the ASCII codes you want to filter out are 17, 19, 30, and 31. You'll find the graphic representations of 17 and 19 in Appendix G of your BASIC manual: a wedge-shape and a double exclamation point, respectively. Solid pentagons are produced by 30 and 31.

You can use a number of other tips and tricks. For example, if you frequently use the Media General database, you should know that Media General will send you a free 18-page booklet listing the names of companies to be found in industry groups. The firm also publishes *IndustriScope*, a 150-page monthly magazine that includes information not found in the DJN/R manual. Contact: Mr. Larry Gould, Media General, Inc., 333 East Grace Street,

Richmond, VA 23219, (804) 649-6430. (The Media General database on The Source is somewhat less extensive than on DJN/R, but Source subscribers may want to contact Media General directly as well.)

Unlike in some systems, in DJN/R you don't need to "leave" or "quit" a feature and return to a menu when you want to move on. Regardless of where you are, you have only to enter // followed by the correct DJN/R code to go instantly to your chosen destination. You can also enter commands that will automatically skip menus and prompts. As the manual points out, you can enter a period followed by a category or stock symbol at the "Enter query" prompt when you want to go to the DJNEWS database.

What the manual doesn't tell you is that you can use the same technique to go to the Current Quotes or Historical Quotes databases. For Current Quotes, you can use a comma followed by up to five stock symbols separated by spaces. For Historical Quotes, use a semicolon followed by the stock symbol and either P1 or P2. (See the manual for an explanation of these last two arguments.)

It is also worth pointing out that, unlike many services, DJN/R does not simply connect a stock quote wire to its on-line service. All incoming quotes are constantly monitored by the editorial department. If a stock quote doesn't look right, Dow Jones editors immediately contact the appropriate industry personnel for confirmation. Few other services have this kind of quality assurance.

The full text of the *Wall Street Journal* from January 1984 on is now searchable in the DJN/R Text database. Abstracts and

**APPLE ONCE DEFINED THE TERM
"PERSONAL COMPUTER," BUT THEN THE
IBM PC CAME ALONG AND REDEFINED
THE TERM AT A HIGHER LEVEL. DELPHI
MAY BE DOING THE SAME FOR THE
TERM "INFORMATION UTILITY."**

summaries of issues dating from June 1979 are also available, as are a number of other Dow Jones publications. And virtually everything is on-line within 24 hours of publication.

There's a separate DJN/R manual for this feature, but you no longer have to request it specially since Dow Jones began mailing copies to all subscribers earlier this year. A new, comprehensive manual covering all aspects of DJN/R is in the works and is expected by the fall.

DELPHI: THE WAVE OF THE FUTURE?

Apple once defined the term "personal computer," but then the IBM PC came along and redefined the term at a higher level. General Videotex Corporation's DELPHI service may be doing the same for the term "information utility." Although by far the smallest and least known of the services discussed here, DELPHI is a real gem. It is in all probability the wave of the future.

DELPHI's system software is slick. Its response time is excellent. And its price is right: \$6.00 an hour in the evening and \$16.00 an hour during the day—with no Tymnet charges, no premium for 1200 baud, and no monthly minimum. A subscription costs \$50 at a computer store and includes 2 hours of free evening use. "Starter Kits" cost \$30 and include 1 hour of free time. You can contact the company directly.

DELPHI is one of the least expensive

on-line services to use and join. But at the same time, it offers more of what many people join a service for. In fact, DELPHI combines some of the most popular features of The Source and CompuServe and then goes those systems one better.

For example, DELPHI not only offers electronic mail, it also lets you send electronic letters from DELPHI to subscribers on The Source or CompuServe. This process does not work in reverse, but it's an important first step in linking the various electronic mail services. You can also send a single, hard-copy letter via the United States Postal Service's ECOM System for 95 cents. And you can send a Telex or TWX message at rates comparable to Western Union's Easylink but without the \$25 per month minimum that EasyLink charges after your first 90 days.

DELPHI has some 35 bulletin boards similar in function to the Post feature on The Source, as well as a real-time conferencing feature like CompuServe's CB Simulator. It also has a number of on-line special interest groups (SIGs) and an extensive member-publishing area called "Infomania." Infomania users have even written a continuous, collaborative novel similar to the user-written soap opera series that has been so popular among users of Murray Turoff's (The Network Nation) EIES conferencing system.

Zork, Adventure, Star Trek, and other games are also on-line. You can access the computer shopping service, Comp-U-Store, as well as an electronic typesetting service and the *Official Airline Guide* (OAG). DELPHI has a home banking/bill-paying service that as of this writing can be described as "state of the art." As

the manual points out: "The banking feature turns your terminal into a teller machine that does everything but dispense cash (unless you have an exceptionally fine graphic printer)." You can even buy and sell stocks and other securities on-line, using the discount brokerage services of the North American Investment Corporation.

DELPHI has a number of interesting (and money-saving) features to offer in the information field as well. Its on-line encyclopedia is not unique. But the opportunity to query an outside expert through DELPHI's Oracle feature is. The individuals who comprise the Oracle can supposedly answer virtually any question from how to use more than 704K in your IBM to how to make a dovetail joint.

For more conventional information searches you can use the services of COIN—the Colorado Online Information Network of professional researchers. COIN charges a \$25 minimum per request, and the total cost can be much higher, depending on the amount of time required. But the service will quote you a price in advance, and whatever the cost, it may be cheaper than conducting the search yourself.

DELPHI also provides a gateway to the DIALOG service. If you elect to access DIALOG through DELPHI, you will be



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billed at the standard DIALOG rates. However, DIALOG adds \$8 per hour for Tymnet access, whereas DELPHI only charges \$6 an hour.

Similarly, you can use DELPHI as a gateway to the ITT Dialcom service. Dialcom offers a number of databases, including the UNIXTOX financial database and the United Press International news wire. If you had your own Dialcom account, you would have to pay a \$100 a month minimum. DELPHI, in contrast, gives you access to Dialcom for \$20 or \$30 an hour, depending upon the time of day.

DELPHI is far from perfect. At least one user reports that the Dialcom gateway is somewhat difficult to control. There is no way to prevent another user from interrupting what you are doing with a "page" inviting you to the "conferencing area" for a chat. The manual does not include pricing information for the various "extra value" services. You must obtain these prices on-line. In addition, in the past year some features have been announced long before implementation.

But the idea of a thoughtfully implemented, one-stop service that can handle virtually all of your on-line needs is irresistible. DELPHI does charge extra for some services, but only when and if you use them. It is also an exceedingly "human" system. The manual and the on-line help information both show a sense of humor, wit, and a unified vision of what an on-line service should be—something that is rarely encountered in the field.

In short, DELPHI can be considered a second-generation information utility. And for people who are new to on-line communications, there is no better—or less expensive—way to discover what

databases and electronic communication are all about.

DIALOG AND THE KNOWLEDGE INDEX: INFORMATION ONLY

The Lockheed Corporation's DIALOG is the Neiman-Marcus of the on-line field. It is an information "department store" that has virtually everything you could want (and many things you didn't know you needed). Much of its merchandise is rather pricey. And it puts out a catalogue and customer mailings that are absolutely dynamite.

Fortunately, DIALOG has a low-cost subsidiary called The Knowledge Index (KI). Both are for serious information seekers, and if you fall into that category, your first decision will be whether to join one or both. DIALOG gives you access to over 200 separate databases or files. At this writing, KI offers 24 of those files, but more will be added in the future. DIALOG can be accessed virtually round the clock; KI is available only at night. DIALOG's bills are due on receipt. The Knowledge Index charges on-line costs to your credit card. Neither service requires a monthly minimum, and both offer superb manuals and support.

The biggest difference is cost. DIALOG costs range from \$25 to \$300 an hour, depending upon the database you're

searching. To that you must add \$8 an hour for Telenet or Tymnet access. Uninet and the firm's own DIALNET cost \$6 an hour. A DIALOG subscription is free, but you can expect to spend an additional \$50 for your DIALOG manuals.



A Knowledge Index membership costs \$35 but includes two free hours on the system, your documentation, and a subscription to the quarterly newsletter. Best of all, KI charges \$24 an hour, complete. There are no communications surcharges, and you are not charged for each citation you ask to see. For these reasons, the most important tip one can give a newcomer is to join The Knowledge Index. If you find that you like it, you can always join DIALOG later.

Whichever service you choose, however, you'll be able to make the most of it if you bear two things in mind. First, the files you access are not created and maintained by Lockheed. They are supplied by individual companies or "IP's" (Information Providers) as they're known in the



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KNOW YOU NEEDED.**

trade. Second, many IPs have brochures, publications, pamphlets, and manuals that describe their products more fully than the documentation supplied with your subscription.

The ABI/INFORM database (File 15 on DIALOG; BUS11 on The Knowledge Index) is an excellent example. A product of Data Courier, Inc. in Louisville, Kentucky, ABI/INFORM gives you access to everything from *Business Week* and *Forbes* to *The IBM Systems Journal* and *Vital Speeches*—plus some 600 other magazines and publications, worldwide. What the DIALOG and KI manuals do not tell you, however, is that the firm will be happy to send you a complete list of journals, an 80-page guide to searching the database, and subscriptions to three bimonthly newsletters filled with hands-on tips for using ABI/INFORM.

This information is absolutely invaluable, and all of it free. In fact, ABI/INFORM even offers free telephone support should you have a problem using the database. For more information, call (800) 626-2823; (502) 582-4111, in Kentucky.

BRS AND BRS/ AFTER DARK: INFORMATION BARGAIN

Like DIALOG, Bibliographic Retrieval Services (BRS) is a major-league information system. Founded as a lower-cost alternative to the Lockheed product, BRS offers some 80 databases,

many of which are available nowhere else. It also has many of the same files as DIALOG, so in some cases you can obtain the identical information from BRS at a much lower rate.

Again, the ABI/INFORM database is a good example. On DIALOG the lowest rate an individual would pay to search ABI/INFORM's 600 magazines and journals is \$79 an hour. The comparable rate on BRS is \$42 an hour. On the other hand, BRS charges \$50 a year to maintain your account under the pay-as-you-go Open Access plan; a DIALOG account is free. Also, while both organizations offer excellent telephone support, BRS cannot match the quantity and currency of free supplemental information DIALOG subscribers regularly receive.

Generally, the same things apply when comparing The Knowledge Index to BRS's low-cost subsidiary, BRS/AFTER DARK. AFTER DARK subscribers pay \$15 an hour to search ABI/INFORM and \$6 an hour to search ERIC (Educational Resources Information Center). Searching the same two databases on The Knowledge Index costs \$24 an hour. On the downside, AFTER DARK forces you to pay a \$12 a month minimum fee whether you use the service or not. KI has no such charge.

Also, while the AFTER DARK system and documentation represent a sound, professional start, the service has a considerable way to go to catch up with The Knowledge Index. The AFTER DARK manual contains an extensive, well-written tutorial on how to use the system, for example. But nowhere will you find any information on what it costs to use each of the system's databases. Since these costs

can range from \$6 to \$15 an hour, this is not an insignificant omission. In some cases, the prices are included in on-line descriptions of the databases, but not always. A complete price list has been in the works for some time and is expected shortly. Until it arrives, call customer service.

AFTER DARK has also fallen prey to the problems of "pre-announcing" services. Electronic Mail, the Swap Shop, Barter Service, and Software Service have been selections on the main system menu for over a year. By mid-summer 1984, none had been implemented, though access to MCI Mail is promised for the fall of 1984 or early 1985.

Though they will have to be corrected, these are really just surface blemishes. It would be a mistake to let them obscure the considerable strengths of the system. BRS/AFTER DARK offers a powerful, well-documented search language and at least 40 databases. This means that approximately half of the regular BRS offerings can be searched after hours at discount rates.

With MEDLARS, International Pharmaceutical Abstracts, and at least ten other medically related databases to offer, it is no wonder that doctors account for a large percentage of AFTER DARK subscribers.

(continued)



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But the service also offers such databases as Management Contents, the engineering database INSPEC, the full text of the *Harvard Business Review*, and DISC, BRS's own database of personal computing magazines and related literature.

If you decide to subscribe to AFTER DARK, there are at least three techniques that will help you use the system more efficiently. They're all in the manual, but they're tucked away in the tutorial material and so are a bit difficult to find. The most important technique is to hit your Enter key when you are prompted to set your page width and length each time you sign on. You will then receive information in a continuous stream, without being constantly prompted to "Hit Enter for next screen."

The manual states no clear-cut way to navigate the system, so you should know that hitting *D* at a prompt will take you to the previous menu; hitting *M* will take you to the main menu (hitting *Q* will do the same thing).

Finally, learn to "stack" commands on a single line. Stacks are actually instant one-line batch files containing all of the commands and responses to system prompts needed to accomplish a task—without the need to view intervening menus. This method cuts down on connect time and thus saves you money. The only catch is that you have to be familiar enough with the system to know exactly what strings of commands are required.

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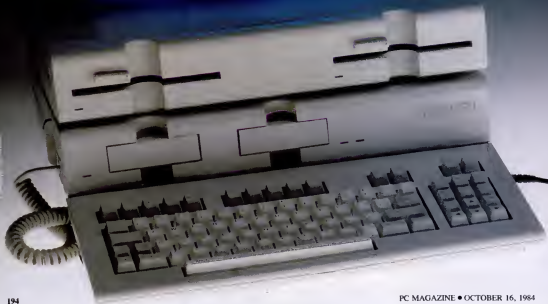
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Mindset on Graphics

The Mindset is a sleek-looking PC-compatible designed for graphics applications. Paired with the Lumena software, it is a brilliant new performer.



Behind glass in the permanent design collection at the Museum of Modern Art in New York City sits the Mindset Personal Computer. At 16 inches wide and only 6 inches high, this beautifully designed and engineered white PC-compatible is like an Italian sports car: it's fast, sleek, and sometimes has a mind of its own.

Mindset Corporation designed this machine especially for use in graphics applications. President and founder Roger Badertscher (formerly of Atari) believes that computers will revolutionize graphics in business, education, and entertainment. He hopes to find a large market in art applications from design to advertising storyboards.

The Mindset runs under MS-DOS, but in an unusual way; because it uses special system calls, it won't run a DOS-formatted disk. You have to reformat your disk first, fortunately a relatively simple procedure.

The Mindset is basically a bit-mapped computer that uses two VLSI (very large-scale integrated) chips, one for graphics, the other for video display. The Intel 80186 clock runs at 6 MHz instead of the standard 4.77 MHz. Its frame buffer and system memory are on separate buses. These features give it an incredibly fast drawing construction rate: images move onto the screen at 800 nanoseconds per pixel.

The Mindset's highest color resolution is 320×200 pixels. It makes 512 colors available, 16 at one time. The expansion unit, which contains 96K of RAM, two



Mindset Personal Computer

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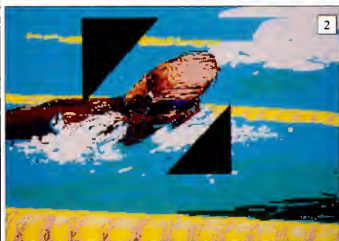
List Price: \$2,398 with 256K and two disk drives. *Lumena* software, \$399.

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Luminous Lumena Pictures

In creating the artwork for the swimmer picture, Figure 1, I used the FILLFLOOD command to create a neutral gray background. Then, using the Pen mode, I roughed in the figure in black line. I changed

to a larger brush and blocked in the various colors, then used the LINE command to construct the yellow lane dividers and the FILLTO command to color the water and other large areas. To distort the swimmer



in Figure 2, I used the OBLIQ command to "rubberband" the area blocked off by the triangles, and angled that part of the image. In the last figure of this series, Figure 3, I went back into the picture to recolor

the triangular areas displaced by the oblique move. I constructed the diver in Figure 4 in much the same way as I did the first drawing; I added background atmospheric dots in a wide

(continued)



disk drives, and three I/O ports, snaps on top of the system unit, which houses the microprocessors, an additional 64K of RAM, 32K of ROM, the frame buffer, two cartridge ports, and three more I/O module ports.

The well-designed keyboard has white, standard typewriter keys that contrast with gray, special computer keys. Function keys are separated into two blocks of five. The cursor keys are well positioned, as is the easily accessible system on/off switch. The Mindset has semicircular cutouts that allow you to easily insert and remove disks and cartridges—any add-on memory or controller hardware is on cartridges, not cards, so rather than install them, you simply slip them in and out.

The two-button mouse is also attractively designed, but for serious work you

The Mindset has semicircular cutouts that allow you to easily insert and remove disks and cartridges.

will probably want a stylus and pad, unless you enjoy drawing with your fist. Standard digitizing tablets can be integrated through the RS-232 interface.

Lumena

A sophisticated software package called *Lumena* from Time Arts Easel has been developed for the Mindset: it was included with the system I tested. You call up the *Lumena* menu by moving the mouse off screen. It covers the screen's lower fifth. The menu disappears when you are working on an image. This main menu and its various submenus include more than 100 functions and commands. The color display is broken into two parts:



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a bottom row of the 16 basic colors and a top row of "dithered" colors—two colors that are placed next to each other to create the impression of a third. These dithered colors expand the palette and add new texture possibilities, but they look like checkered tablecloths for ant-size people.

RGB or TV?

The system can be configured to work with either an RGB monitor or a standard television set. The RGB gives you brilliant, true colors, but a television permits blending and altering of hues. On an RGB, you can change the color palette, but when using a television, you can use the MIX command to change a current color by mixing it with another hue. As far as I know, Mindset's color-mixing function is the first of its kind implemented on a micro. With this command, if you select a color on your palette or drawing, the current color will change in gradual steps toward the selected color as long as you hold the mouse button down. If you depress the button too long, the colors will become the same.

When the Mindset is configured for a television, you can use other commands to slowly change a color toward red, green, or blue by moving it around the screen in a Y pattern. Whenever you put a color on the screen, a prompt appears at the top telling you the red, green, and blue content of that color on an intensity scale from 1 to 10. If you're willing to toss out all the knowledge you have of color wheels, triads, and the standard color theories of the known free world and work with the RGB system of constructing color, this system is for you. Creating color from transmitted light in computer and video art is totally different from doing so with reflected light in conventional art. If you do want to learn about it, the method is explained in the Mindset documentation.

Lumena Commands

At the far right on the Lumena menu, a status box tells you the current color, brush or pen thickness, and current com-

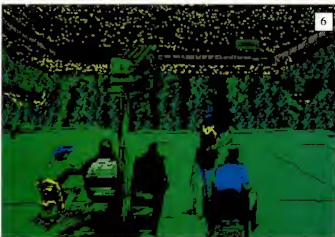
Luminous Lumena Pictures (continued)

spatter pattern using the AIRBRSH command.

Color Changes

The tennis player in Figure 5 was sketched in one color. I then blocked

in larger color areas using a wider brush. I indicated the crowd using Lumena's STAMP command, called Custom Brush, which repeats an image or pattern of pixels wherever you indicate. In Figures 6 to 8, I



cycled the same design through different colors from the palette menu using the ALTMAP, XCHCOL, and SHIFT commands. These commands allow you to experiment with different and sometimes bizarre

ways of combining colors. Although by no means unique to the Mindset computer, this function lets you quickly see pictures that would take many hours to construct using traditional methods.—T.C.



mand. You can alter the brush or pen thickness easily by clicking with the mouse over this number and moving to the left. The number will cycle through all the possible values until you release the mouse button.

Lumena also has an AIRBRSH command. You can alter its spray using the same mouse technique to permit a wide, full-screen spatter or a close array of dots. You can alter color density by holding the "airbrush" down in one spot. The AIRBRSH command is a nice piece of programming wizardry. It allows you to brush up to four colors together in a random pattern across the screen. The effects

The AIRBRSH command is a nice piece of programming wizardry. It allows you to brush up to four colors together in a random pattern across the screen.

are quite beautiful, especially on a black screen. You feel as though you were wielding Mickey Mouse's wand in the "Sorcerer's Apprentice" sequence of the movie *Fantasia*. Like the pointillist technique on canvas, the AIRBRSH command can create the impression of color and form by combining several colors.

Lumena has its own version of the STAMP or COPY command found in other programs. It repeats patterns on the screen singly or as part of a complex brush stroke.

Lumena makes all the standard graphics tools available to you: freehand line drawing; automatic straight lines and box-

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es that stretch or "rubberband" to whatever point you like; and circles and ellipses that you can define with four cursors before you draw them in. The system also includes the graphics programmer's delight, the ever-fun symmetry function that lets you create kaleidoscopic images that start from the four corners of your screen. You can enter text into a picture using the keyboard. You can also draw lines com-

I spent 90 percent of my time wrestling with the literature and 10 percent using the system to draw. This ratio confirms the worst suspicions of most artists.

posed of text characters, using a single character as a brush. The program's fill modes work exceptionally well: they let you switch colors or flood the screen with color.

The system has a unique ERASE command that lets you selectively remove a color from large blocks, 1-pixel lines, or part of an airbrush pattern. Some other interesting commands include P/W (to activate a brush mask to write over or protect one specific color), DUP (to fill a defined area with a repeated image), TURN and OBLIQ (to tilt and rotate images), XY-SCL (to squeeze or stretch images), and ALTMAP and SHIFT (to cycle through different color maps).

Drawbacks

My general method of attack on a new system is to skim through the manual and then to dive in intuitively. This method

worked up to a point on the Mindset, but I finally had to study the documentation to progress any further. The documentation is the real problem with this package. I spent 90 percent of my time wrestling with the literature and 10 percent using the system to draw. This ratio confirms the worst suspicions of most artists about working with computer graphics. The level of the documentation is inconsistent: it runs from memorable suggestions such as "locate your system near a power outlet" to hard-to-follow explanations of the system's programming language. The manual does include a tutorial, and *Lumena* has a context-sensitive help function (called Doc), but they're both too confusing and general to be of much use. Mindset is aware of this problem—I received two updates on the documentation during the week I had the machine—but the company still needs to improve the manual substantially.

I had the most difficulty understanding the manual's instructions for using LOAD and SAVE commands. I wasted 2 days figuring out how they work—an extremely frustrating effort. I called the Mindset WATS hotline, but the representative could offer no technical advice. Instead, the representative seized the opportunity to try to sell me another system. Finally, another Mindset representative admitted that the instructions were wrong and sent me clearer instructions.

The Mindset sometimes exhibits the strangest behavior. You can be zipping along when it will suddenly conk out for no apparent reason. You're left to reconfigure the system and start over. These shortcomings may be particularly frustrating to artists who are interested in it primarily as a tool and don't want to become computer literate in the process of learning to use it to best advantage.

Nonetheless, the Mindset's designers have pushed this micro to the limit of its power. Right now it can be used for illustration and possibly fine art; when the company gets the system's problems under control, the Mindset will follow your course instead of its own. ■



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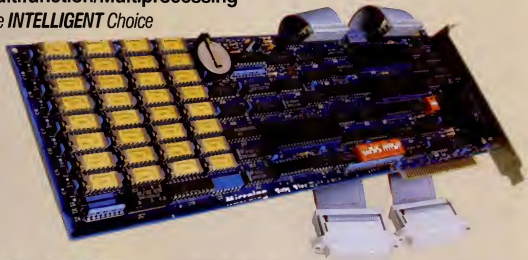
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Clock Software: sets Baby Blue II's clock and initializes the system clock at boot time—never type the time and date again!

Communications

Smart Terminal Emulator Package (STEP): talk to other microcomputers or connect to larger host computers, as an asynchronous terminal through Baby Blue II's serial ports. Unlike other "smart terminal" programs, STEP offers full emulation of popular video display terminals (the standard package includes Televideo 950 and Hazeltine 1500).

IBM 3101, DEC VT100 and many others are optionally available). You can send or receive text files, and with STEP's unique Sessions Menu, changing your configuration is a keystroke away.

BSTAM File Transfer Utility: Transmit and Receive text, HEX, and binary files (including COM files) without errors and without fuss. BSTAM is easy to use, with all configuration parameters handled transparently under STEP.

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Some of the likeliest candidates for CAD software have found it financially out of reach. Mega CADD, Inc., has targeted this market with an affordable alternative.

A CAD System for the People

Mega CADD is a small company with big plans. This Seattle firm relied heavily on the PC's computing power and versatility to create its computer-assisted design software. The result: *Design Board 3-D*, an inexpensive and easy-to-use program that enables draftsmen and architects to model anything from a silo to a soccer net in a matter of minutes.

"The *Design Board 3-D* program allows you to model spaces in three-dimensional terms before putting anything down on paper," says Mega CADD marketing communications manager Karen Kershaw. "It's the first front-end design

software package for the IBM PC."

Design Board 3-D was conceived several years ago to help in the rehabilitation of historic properties in Seattle's business district. Now Mega CADD is introducing the product at trade shows and receiving an enthusiastic response from potential customers. "They're lining up seven deep at the shows," says Robert Lebow, vice president of sales and marketing administration.

Lebow and other Mega CADD executives view this initial enthusiasm as a hint of successes to come. *Design Board 3-D* promises to be "as important to designers as programs like *VisiCalc* were to finance," according to Kershaw, "and it's

very simple to use. You can practically put your keyboard away forever, because almost all interaction is with a mouse."

Of Mice and Men

Seated at a PC in a corner cubicle, Greg Bloom, vice president in charge of products and services, puts the package through its paces. "The creation space is the grid on the left," he says. "The plan view is on the left, perspective on the right. First let's put down a floor slab." He uses the mouse to mark off two points on the grid. "Those two points defined the sides and gave the depth."

The mouse darts back and forth as Bloom chooses shapes—a cylinder and



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MEGA CADD

two rectilinear boxes—to “build” what looks like a suburban office complex atop the floor slab. “To put a dome on that cylindrical building,” he says, “I select the height, 45 feet”—the mouse-driven cursor flits over the numbers on the menu—“and say ‘sphere.’”

“The program asks how many degrees,” Bloom continues. “A full hemisphere, 180 degrees, is the maximum. Let’s make it 120 degrees.” Another flick

Design Board 3-D was conceived to help in the rehabilitation of historic properties in Seattle’s business district.

of the mouse, and the dome starts to appear on the screen. Bloom has accomplished in seconds what would have taken a draftsman laboring with pen and ink many minutes.

Bloom switches into the Modify mode and produces four different views of his design: top, front, side, and perspective. He rotates the image on x, y, and z axes as deftly as a drum major twirling a baton. Results are all but instantaneous. Bloom then inserts a sheet of paper in the printer and a few seconds later has a hard copy of his design.

Learning the system is quick and painless. Anyone can pick up the basic operating procedure in half an hour or less. “One day I came in and found the 9-year-old child of one of our employees playing with it after only 10 minutes of instruction,” says Bloom.

The staff of Mega CADD foresees many different applications for *Design Board 3-D*. Architects can use it to produce floor plans and perspective ren-

derings of buildings. Interior designers can use it to visualize how a room will look after renovation. Graphic designers and commercial artists can use it to make preliminary studies of their artwork, produce diagrams for reports or board meetings, and perform hundreds of other tasks.

“Technical illustrators, furniture designers, engineers—anybody who needs to think in a three-dimensional way falls in love with it,” Lebow says. He adds that *Design Board 3-D*’s potential uses go far beyond architecture and design. He sees a student market as well as markets for biochemists, geologists, and other scientists.

“I was out on a boat with a biochemist friend the other day and described our product to him,” says one Mega CADD executive. “He was interested immediately in using it to model molecules.”

History Lesson

One rainy afternoon in May, the Mega CADD staff gathered in a conference room in its offices overlooking Seattle’s Space Needle and Puget Sound to explain the origins of *Design Board 3-D*. “I needed the product,” says chairman David Nielsen, who inspired its development 2½ years ago. Nielsen was supervising the rehabilitation of some downtown buildings and wanted three-dimensional perspective drawings “without waiting for an architect to make a rendering.”

Nielsen had discovered the dollar value of such drawings during a warehouse rehabilitation project in 1981. They increased income from the building by showing how to give it a panoramic view. He also realized how computer-generated views of a proposed building or renovation would make it easier to describe the project to a banker or an investor.

Nielsen envisioned a CAD package that would do the job faster than an architect working with pen and straightedge and at a more affordable price than the expensive CAD systems available then.

“Systems cost a quarter of a million dollars and up,” Greg Bloom recalls.

Building a Team

Shortly thereafter, Nielsen put the Mega CADD team together. Bloom came from Applicon, a leading supplier of CAD systems, and brought with him abundant experience in system and software development, project marketing, and management. Lebow had a distinguished reputation in sales with Avon Products in New York and had been northwest sales manager for Steelcase, Inc. President Jay Ackley had an outstanding record of success in financial and business management consulting, notably as president of the Praxis Corporation, an investment company.

Ackley had a strong entrepreneurial background and valuable expertise in setting up new, small companies like Mega CADD. He was pleased to find that the team functioned well together. “We listen to each other’s opinions, and our diverse backgrounds will make the company a long-term success,” Ackley says. Nielsen agrees: “The whole is greater than the sum of its parts.”

Learning the system is quick and painless. Anyone can pick up the basic procedure in just half an hour or less.

At first the team thought in terms of minicomputers, Nielsen says, and then evolved into microcomputer applications. But the technology was less important to Nielsen and his group than the market for it. Their objective was to create a software package that would appeal to as many people as possible.

(continued)

Measuring the Dimensions of Design Board 3-D

Simplicity, speed, and an as-yet unmatched price make this program stand out among CAD systems for the PC.

CAD systems no longer are the exclusive domain of the wealthy; they can now be obtained for your PC at a modest price. *Design Board 3-D* is distinguished from other affordable, PC-compatible CAD programs by two things: it realizes an image on the screen in three dimensions, and it's extremely easy to use. The 8087 coprocessor makes it incredibly quick—you can float spheres in block canyons, build 3-D cities, and spin planes in space.

Like expensive CAD systems, *Design Board 3-D* uses a floating-point database instead of an integer numerical format. It stores detail at a higher resolution than that of the monitor, so your image can be translated onto paper via plotter in smooth lines without "jaggies," the stair-step look used to simulate curves.

Once you have the system up and running, three different screen configurations are available with which to create images. The Create mode is where you

establish the basic shapes. In this mode you draw your model two-dimensionally with a mouse, and it appears over a grid on a large window on the left side of the screen. To the right, a smaller area displays the image in perspective. The menu fits along the bottom of the screen and on the right side under the perspective view, listing commands that you can invoke with the mouse.

Standard shapes (called *entities* in architectural vernacular) can be used as building blocks: squares, rectangles, polygons of various sizes, circles made up of 17 short connecting lines, and spherical and elliptical domes (the latter resembling inverted canoes and having just about as many uses in the design world). You can store the shapes you create and reuse them as often as you want. Objects are usually constructed on the screen in four steps: Select the shape from the menu, define one side, orientate the other sides, and set the position of the top and bottom to give the object height and depth. Squares thus become blocks and circles become cylinders; you can work with these shapes to create 3-D designs. For example, you can stack shapes and objects by making the base elevation of one equal to the top elevation of another.

As you move the mouse, the x, y, and z coordinates appear on the screen. Also displayed on-screen are prompts that act as safety valves to protect your work from accidental destruction or misplaced entries.

All models appear as wire frame structures as you create them, but when

you wish to see what a solid, nontransparent shape will look like, the command *Hden Line* eliminates all the structure lines you normally would not see. Another useful feature is the *Surface* command. With the net-type planes it creates, you could define, for instance, an expanse of fabric curving over a chair frame. These planes are created much the same way as other shapes: You plot points and sides and the grid fills in and forms a plane.

Rotate, Move, and Scale

The next screen in sequence, *View*, reverses the priorities so that the perspective image takes up the larger part of your screen. Here you can rotate your work on the x, y, or z axes, or all three at once, giving the impression that the object is turning in space or that you are walking around it. You can also move a single part of the construction without affecting the whole.

The *Rotation* command gives you the instant gratification of being able to see your model perfectly drawn at any angle, a feature that eliminates hours of drudgery with traditional methods and drafting tools. The *Move* command lets you cut and paste on-screen, and the *Scale* command lets you change the size of part or all of a drawing. The *Fit* command returns your work to the original configuration. To help you keep track of what you've done, each object or form that you create is assigned a number that shows up when you wish to rotate, move, or scale it.

The third screen configuration, *Mod-*



Design Board 3-D

Mega CADD, Inc.
401 Second Ave. S.
Seattle, WA 98104
(206) 623-6245
List Price: \$750

Requires: 256K RAM, two disk drives, PC-DOS 2.x, Microsoft mouse, 8087 coprocessor, standard or medium-resolution graphics card. Plotter or dot matrix printer optional.

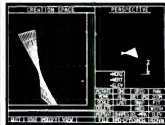
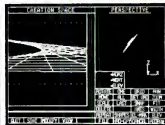
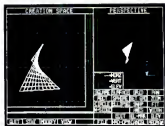
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ify, lets you stretch, compress, zoom in on, and otherwise manipulate objects. For instance, you can move lines in parallel motion and to a single point to collapse and stretch an object. You can create pyramids and cones on a screen that is divided in four equal parts showing the top, front, right side, and perspective views. Operations such as canting a roof or gauging the slope of a chuck on a power drill could be accomplished on this screen.

The Bad News

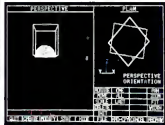
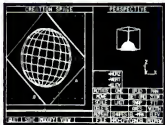
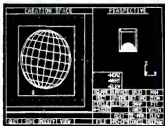
For all its vaunted capabilities, *Design Board 3-D* is not without limitations. Although the Surface command can show regular or irregular contours of a plane in space, it is not exact enough to qualify as a cartographer's tool. The program has no freehand sketching ability; Mega CADD promises to include that capability in a planned revision, but for now the manual suggests that you work out rough ideas on paper first. You also can't use the mouse to trace over a drawing or blueprint to input dimensions. The system cannot stack screens or overlay images (many sophisticated PC CAD programs can overlay up to 30 levels). You can't change or vary the stroke width of a line. Moreover, you can't enter text in any form for relative measurements or labeling.

Design Board 3-D is a useful but limited program. Since you can't overlay screen images or get very fine line detail, I doubt that it will send I. M. Pei or Philip Johnson running to the nearest ComputerWorld. But small to medium-size



With the Surface command in the creation screen, the wire meshlike plane can be rotated in space.

architectural firms, industrial designers, interior designers, and urban planners would find *Design Board 3-D* helpful at the conceptual stage. It could conceiv-



A sphere is placed in a rectangle and the viewer's perspective or station point is altered.

ably take the place of the cardboard and clay concept models that transportation and product designers use for client presentations.—Tom Christopher

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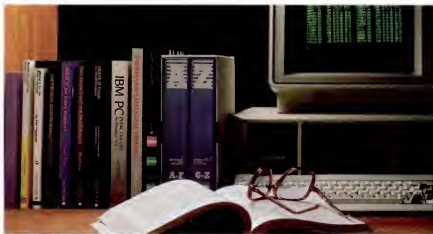
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MEGA CADD

"Most customers would be small firms, with an average of nine people or less, that were buying PCs not for CAD but for applications like word processing and spreadsheets," Bloom said. CAD systems that were previously available were too expensive for these firms. The PC helped make it possible for Mega CADD to put together a CAD system that cost only \$750 and, Bloom says, "could run on 70 percent of the personal computers being sold—either PCs or PC-compatibles."

But there is much more to the Mega

The PC helped make it possible for Mega CADD to put together a CAD system that cost only \$750.

CADD strategy than merely cutting costs. Equally important is functionality. Some CAD products "are affordable but not so functional," says Nielsen. Mega CADD was determined to give customers as much functionality as possible for their dollar, and the Seattle team thinks it succeeded.

Another aim was to avoid elitism. "CAD so far has been an elitist tool because only big companies could afford CAD systems," says Ackley. Kershaw points out that there is also a vast difference between Mega CADD's easy-to-master program and earlier CAD systems that "only specialists could understand."

Early users of *Design Board 3-D* were pleased with it, and one of them, though perhaps without realizing his contribution, gave the product a much-needed name change. "The original name was *Curvilinear Architecture*," Lebow says. "Then a well-known design engineer who had previously been using ink pens said to me,

"You just automated my design board!" Thus *Curvilinear Architecture* became *Design Board 3-D*.

Future Plans

Though *Design Board 3-D* has only recently been introduced, Mega CADD has impressive plans for the future. The firm envisions a "project integrator series" that will incorporate *Design Board 3-D* and other integrated "application modules" specialized for word processing, accounting, and other uses, and a UNIX-based operating system.

The company recognizes the importance of good support and documentation and is trying to make the latter so easy to use that the former will seldom be needed. With each product, Mega CADD plans to include a full user's guide with a self-paced tutorial. Dealers will receive a demo disk with a self-paced demo, and dealers and users will have access to toll-free "help-lines" for support and training.

Will *Design Board 3-D* fare as well as its makers hope? Financing will do much to determine the product's future. Now that the software has been developed, Mega CADD will need much more money to promote it in an intensely competitive market where ads are expensive and many other products are already fighting for the consumer's attention. "It takes money to make yourself heard above the crowd," says Ackley.

Mega CADD's small size (seven employees) may give the company an edge over its bigger competitors in the CAD field. "We're very flexible," Bloom says. "That means we're going to stay around."

Bloom also thinks Mega CADD's microcomputer orientation will help the firm compete. "It's hard for big CAD companies to relate to the PC environment," he says. "They're used to thinking in terms of \$250,000 systems."

Lebow sums up Mega CADD's hopes: "We only seven people, but we intend to be world-class contributors." ■



The PC may take
Hollywood by storm,
not because of its beauty or acting
ability, but because it can make film
production more
efficient.

The PC Goes Hollywood

After several summers' excursions through *Star Wars*, *The Black Hole*, lost arks, and temples of doom, moviegoers have become familiar with the magic of computer special effects. Specially designed computers have transformed the art of film-making, lifting screen artifice to never-before imagined levels of reality.

But what movie audiences haven't seen is a computer revolution that may actually be much more important for the future of the film industry than any on-screen trick. This is the new and growing application of computers, especially IBM PCs, in the business of producing, scheduling, budgeting, and paying for films—a process that hasn't changed much since the inception of movies in the early 1920s.

What makes the growth of movie-making computing so important is the fact that

creating a film is a monumental crap shoot. Millions of dollars are spent each year on films the public doesn't want to see. And even successful movies are plagued by cost overruns, confusion, and cash-flow headaches.

Enter the PC. By making movie production more efficient and easier to manage, the PC may make it possible for more movie ideas to be produced successfully—on time and on budget. We may be able to select from a greater variety of films with the PC's help.

Most of the new tools for movie companies use variations on standard software capabilities—spreadsheets, database management, and the like. But the requirements of movie-making are so different from those found in most businesses that the new breed of specialty software has found a wide and hungry audience among producers.

Software in the Studio

I'm not a movie producer, but as a screenwriter I was surprised to find how many products are competing for the unknown amount of business in this relatively small, vertical market. I looked at a number of these products and talked with producers, production managers, assistant directors, production auditors, budget estimators, and others who use them.

Emil Safier is president of Quantum Films and the designer of that company's *dataMogul* budgeting and scheduling program. He believes that "if you're doing a feature film budget with Lotus' 1-2-3, you're going to spend a lot of time setting it up. Programs like these were designed for the specific purpose of enabling a user to quickly set up relationships. The price you pay is that you have a very inefficient program, both in its execution and in how it interacts with the user. If you want to change your pay scales, you probably have to go in and change equations or data sequences in the program. You're always working at a level that requires rewriting the program to do a specific task. The system isn't really designed to protect you against the kinds of errors that you might build into it."

Because preproduction of a film is such a unique process, it is particularly well suited to make use of a dedicated package. Jack Smith, president of DotZero, which sells *DotZero* budgeting and scheduling programs, says, "Film budgeting is a process that has evolved over 50 years of doing cost estimates for projects. Each company does it differently—there's no standardization. There are hundreds of different budget formats. If you spend 2 days setting up a spreadsheet program to match a particular budget form, when you go to the next company, its budget form is totally different, and you get to do it all over again."

The preproduction process of a film or video production is made up of a number of very specific tasks that are based on both guesswork and painstaking, detailed analysis. The script breakdown entails dis-

tinguishing each scene by cast, sets (interior vs. exterior, day vs. night), locations, props, stunts, special effects, and any other necessities of the scene. The average screenplay is about 120 pages long, so the breakdown can become voluminous. The same is true of the film budget.

Costing out a production involves grouping the various elements into master accounts, like production staff, set construction, and camera operations, and then setting up subaccounts at a greater level of detail. A typical budget probably has something like 40 to 50 master accounts, with 10 or more subaccounts in each category. A 100-page movie budget is not at all uncommon.

The breakdown of a script into its various elements is the most detailed task in the budgeting process. It starts with the script, which is a tangible document from which you derive the production information you need—how many actors, locations, and so on. But a computer program by itself will help only so much. Many decisions regarding the breakdown of a script remain firmly in the hands of one person.

"Running my script through a program and having it pull out the details—all my characters, what scenes they're in, what pages their lines are on, all my props, my

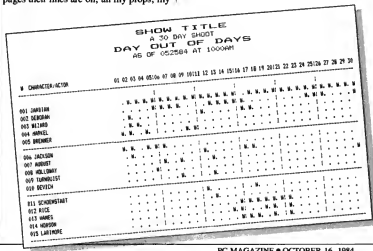
sets, my locations, day and night scenes, and so on—is a fantasy," says Chris Huntley of Screenplay Systems, which markets a budgeting package called *P.M.* "The script can say, 'The army comes over the hill.' What does that mean? Is that

A computer-generated strip board is a good facsimile, but it's not "The Board."

an army of ten? An army of a thousand? And what hill? A hill in L.A.? In Europe? How do you know?" The trained professional is still the one who does the breakdown. The computer can only act as a tool to make that job a little easier.

"There's so much information that isn't in the script," says Steven Greenfield, also of Screenplay Systems. "If we as filmmakers could press a button and have a computer extract material, it would

Figure 1: A "day out of days" schedule made with the DotZero scheduling program.



only be the most rudimentary material. You would still have to go over it step by step and make absolutely sure and have it read by a professional who knows how to break it down."

Emil Safier agrees, but he contends that there is another side. "There are producers who can pick up a script, feel the weight of it in their hands, and say, 'Oh, that's a \$3 million movie.' They flip through it and see a lot of dialogue, a lot of exteriors—that's cheap."

Once you've done the breakdown, you can use the software to sort the data according to any number of criteria—by script-page count per scene, by day or night scenes, interior or exterior scenes, by characters, locations, and so on. For instance, you can arrange it so all of your *day/interiors* or *at the library* scenes are followed by the *day/exteriors* or *at the library* scenes. The data can then be easily reviewed and manipulated to plan the various schedules necessary to the production—the breakdown pages sorted according to the shooting schedule, the one-line schedule for each scene, the strip board, and the "day out of days," a grid-type graph listing all the cast members and the days they're scheduled to work, and so on (see Figure 1).

The day out of days is almost uncontrollable on a daily basis once the film gets into production. If the schedules are done manually, changes due to unpredictable things like the weather make last-minute adjustments almost impossible. "It's the single most tedious job in production," says Jack Smith. "Normally, you only do the day out of days for the cast, because by the time you're done with that, they've changed the schedule anyway, and you have to start over." The computer-generated schedule, however, is so quick and easy to amend that the standard cast chart can now be expanded to include the working schedules of extras, crew, props, and equipment.

The days out of days can be very important to budgeting. Say you know you're going to need a principal actor over

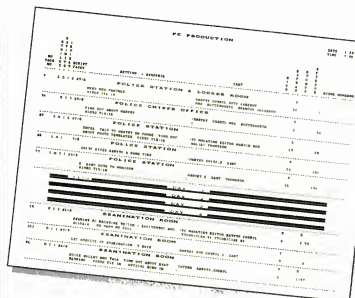


Figure 2: A portion of a FilmTrac-generated strip board.

a 3-week period even though, because of the various location scenes he's in, he's scheduled to work only 8 days. This sort of information can be critical to the budget.

Off the Wall and into the PC

Automating the building of the strip board seems to be the most controversial issue when it comes to computerized scheduling. The traditional production board is made up of a series of colored, movable strips, each maybe an inch wide and a foot long, mounted on a board (see Figure 2). The colors allow for quick reference to whether a scene requires day or night and interior or exterior shooting. Each strip on the board is a unit of production listing various critical pieces of information, such as the scene number, sequence number, scene synopsis, where it will be shot, when it will be shot, who's in it, special scene details, the number of script pages involved, and other specifics. "It's something like an atom that you can't break into smaller pieces of work," notes Emil Safier. The question is, can a

computer-generated board replace the physical one commonly in use?

"A strip board is a very tactile, human thing," points out Steve Greenfield. "You can just take a group of strips, pull them out, and move them, and everyone can stand around and see it. You can't do that on a computer screen. That doesn't mean that it's bad to use a computer to do a schedule or a breakdown, or even to generate the strips. It simply means that, no matter how you cut it, you still need the physical strip board. There isn't a production manager in this town who would go into production without it."

Jack Smith openly admits that a computer-generated strip board can't replace the actual, physical board. It's a good facsimile, but it's not "The Board." But he believes there are numerous advantages to having it, anyway. "If the producer wants to take the board home overnight, you don't give him the actual board. His 5-year-old will spread peanut butter on it. You give him a printout of the board."

Emil Safier, on the other hand, uses

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strips generated by his *dataMogul* software as part of the physical production board. They're printed onto adhesive-backed labels and mounted directly on the colored strips.

Ron Frankel, producer and program developer for Constant C's *FilmTrac*, illustrates another advantage to a software boarding system. "Independents get a lot of scripts. Usually they don't have the time or personnel to analyze them all. They can't do budgets and boards for every script. Well, if a computer can help them do boards and budgets for every script that comes in, they can analyze in much greater detail which scripts are candidates to be made into movies. Once they've created a board and budget, they can take the entire package to a studio and say, 'Here, take a look at it.'" Frankel fully believes in using *FilmTrac*'s computer-generated board in place of the traditional strip board commonly in use. *Filmtrac*'s board prints out in color on 14-inch-wide paper. If changes are made in the scheduling, the computer can quickly generate an updated version.

The *DotZero* scheduling program is currently the only one that's stood the test of time—meaning that it's been on the market for over a year. *FilmTrac*'s scheduling system, while offering many of the same features, was recently introduced after extensive beta-testing on numerous theatrical productions. *dataMogul*'s scheduling program, also extensively beta-tested under combat conditions in the celluloid trenches, is out on the market as of this printing. And Screenplay Systems is in the process of completing its design for a *P.M.* scheduling package.

Tailoring the Budget

While the debate over the benefit of scheduling programs continues, there's no dispute in the industry over the value of budgeting software. Many see the ability to make instantaneous adjustments to a budget as the strongest selling point for these programs. "A manual system can be anywhere from 3 days behind to a week

behind, depending upon how many elements you're working with," comments Jolie Kramer, an independent producer with a background in finance and accounting who uses the *DotZero* system. "It allows a producer or a unit manager to make a decision, in a very short period of time, that can affect a lot of dollars."

Ray Simm, director of finance for Home Box Office, also uses the *DotZero* system. He too sees the benefit of using the software to make changes after the budget's been roughed out. "I can do a budget faster manually than with a computer. But in this industry, changes are a way of life. You start out making assump-

tions of basic premises. As you get closer and closer to production, some of those premises change, so you're constantly making adjustments. That's where the system pays off."

James Jaffee is an associate producer for the Brillstein Company. He started using the *dataMogul* budgeting program when Brillstein began producing NBC's "Buffalo Bill" series. "While we were negotiating with the network for the license fee, the budgeting program allowed us, within 72 hours, to decide whether to do the show on tape or film. The network would then decide whether to order 26 episodes or short-order for 13.

PC Movie Producers

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DotZero

DotZero, Inc.
8425 W. Third St., #300
Los Angeles, CA 90048
(213) 655-4005

List Price: Budgeting program, \$4,750; extra budget forms, \$175 each; scheduling program, \$2,500.
Requires: 128K RAM, two disk drives.

CIRCLE 732 ON READER SERVICE CARD

dataMogul

Quantum Films Software
8344 Melrose Ave., #24
Los Angeles, CA 90069
(213) 852-9661

List Price: Budgeting program, \$1,600; extra budget forms, \$100-\$500 each; scheduling program, \$1,500.

Requires: 128K RAM; 256K RAM and two disk drives recommended.

CIRCLE 733 ON READER SERVICE CARD

P.M.

Screenplay Systems,
348 E. Olive Ave., Suite F
Burbank, CA 91502
(818) 843-6557

List Price: Budgeting program, \$495; extra budget forms, \$50 each.
Requires: 128K RAM; two disk drives recommended.

CIRCLE 734 ON READER SERVICE CARD

FilmTrac

Constant C Productions
1750 14th St., Suite C
Santa Monica, CA 90404
(213) 452-6200

List Price: Integrated budgeting and scheduling program (includes dedicated IBM PC-XT), \$27,500.

CIRCLE 735 ON READER SERVICE CARD

Before software like this was available, it was always an educated guess. You would spend 2 weeks doing a budget to get a bottom-line figure for the 26 weeks. When changes were made, you would have to guess—just pull the figures out of the air. When you're an independent production company without the protection of a major studio, you either do a show for the license fee or the additional money comes out of your pocket."

Emil Safier has his own software success story. "I just used *dataMogul* to help an unbelievably complicated budget for a company that is producing 6 episodes for PBS. Each episode consists of 10 to 20 sequences, and the company wants to budget each sequence as an independent film. Each sequence budget has its own lists for the cast, locations, and so on. So there are three levels: it's a sequence budget, embedded in an episode budget, and everything comes under a series budget. Now, that's complicated."

Dealing with the details in an ever-evolving film budget can make it a difficult document to control. The adjustments that are made span the gamut from single figures to multiple percentage changes. These adjustments may need to be done globally, by master account, by subaccount, or by individual element.

Global changes often involve altering the entire shooting schedule of a production. Say a film is scheduled for 4 weeks in the studio and 3 weeks on location. You might want to see what the difference in cost would be if you switched those times around and shot 3 weeks in the studio and 4 weeks on location. Wage and equipment-rental rates are often different depending upon whether you're in the studio or out on location, and manipulating the shooting schedule could yield a significant savings for the production. When using the dedicated software, "what-if" speculation like this is effortless.

Gig Rackauskas, an auditor for 20th

		A ROLL'S HOUSE	
11-00	STORY		100,000.00
12-00	CONTINUITY & TREATMENT		170,000.00
13-00	DIRECTOR & SUPERVISION		60,000.00
14-00	CAST		2,100,000.00
15-00	TRAVEL & LIVING EXPENSES		0.00
	PRIMES		510,140.75
20-00	PRODUCTION STAFF	ABOVE THE LINE TOTAL =	\$4,790,140.75
21-00	AM		10,245.00
22-00	SET CONSTRUCTION		104,245.00
23-00	SET STRIKING		400,150.00
24-00	SET SPRINKLERS		0.00
25-00	SPECIAL EFFECTS		0.00
26-00	SET DRESSING		0.00
27-00	PROPERTIES		50,000.00
28-00	MEN'S WARDROBE		50,000.00
29-00	WOMEN'S WARDROBE		49,816.00
30-00	MAKEUP & HAIRDRESSING		28,476.00
31-00	LIGHTING		225,350.00
32-00	CAMERA		180,150.00
33-00	SOUND		290,440.00
34-00	TRANSPORTATION		642,295.00
35-00	LOCATION		258,845.00
36-00	PRODUCTION FILM & LAB		0.00
37-00	STAGE FACILITIES		2,841,910.00
38-00	PROCESS - REAR PROJECTION		747,148.00
39-00	PRODUCTION PERIOD TOTAL =		\$4,806,000.00
40-00	POST PRODUCTION SOUND		0.00
41-00	POST PROD. - FILM & LAB		0.00
42-00	MAINT AND END TITLES		0.00
	PRIMES		225,867.83
43-00	EDITING		36,561,900.83
44-00	MUSIC		150,889.00
45-00	POST PRODUCTION SOUND		176,225.00
46-00	POST PROD. - FILM & LAB		171,900.00
47-00	MAINT AND END TITLES		139,192.00
	PRIMES		104,200.00
48-00	PUBLICITY		215,867.75
49-00	INSURANCE		0.00
50-00	MISCELLANEOUS	POST PRODUCTION PERIOD TOTAL =	\$3,421,200.75
51-00	PRINTS & COPIES		148,151.00
	PRIMES		282,825.00
			40,000.00
			177,236.00
			52,715.89
		TOTAL - OTHER =	\$ 681,876.69
		BELOW THE LINE TOTAL =	\$8,885,289.97
		BUDGET TOTAL =	\$13,691,432.02

Figure 3: A budget top-sheet from the P.M. budgeting package, showing above-the-line, production, and post-production costs.

Century Fox and user of Constant C's *FilmTrac*, offers another typical example. "We had a 12-week budget, but we wanted one for 11 weeks minus these and those items. In 45 minutes we had a new budget. It was totally changed, and it was complete." By hand, it would have taken about a day to recalculate all the figures, make the individual corrections to the form, and produce a clean version of the updated budget.

To evaluate whether it's worthwhile to

film on location in another country, producers can quickly insert different costs and currency rates into a "what-if" budget. "We're loading in budgets from all over the world," explains HBO's Ray Simm, "and trying to come up with averages on a country-by-country basis. We'll take all the Canadian budgets that we've had so far and compare the labor rates, equipment rentals, and whatever else we can come up with to make valid comparisons."

Budgets can also be manipulated to make projects more appealing to investors. Say a producer is trying to sell a film

budgeted at \$5 million, but a potential investor has only \$4.5 million to spend. By going back into the program, the producer can play around with the figures for the various parameters—locations, shooting times, and the like—and quickly design a budget that will meet the investor's wishes. On the other hand, if the producer is taking that \$5 million project to a studio that wants to do a \$10 million film, the same process allows the producer to transform the \$5 million film into a \$10 million film.

Scaling the Wage Ladder

Adding or subtracting a week from the shoot is rarely as easy as making a global change in the program. Production unions like the International Alliance of Theatrical and Stage Employees (IATSE) and the Directors' Guild of America often have elaborate pay scales. Take the case of "gaffers" (lighting supervisors). When working in the studio zone they get about \$15 an hour for a 40-hour week—but they're guaranteed a 10½ hour day, which means they're automatically working over 50 hours a week. After 40 hours they get time and a half, so at the hourly scale it's equivalent to almost a 60-hour week. On location everything changes, because the normal work week is 6 days long instead of 5.

"There are about 15 pay schedules for each type of IATSE person," points out Chris Huntley. "Overtime, golden time, different rates for different penalty periods. The first half-hour it's one rate; the second half-hour it's another; and so on."

A budget top-sheet (see Figure 3) is generally divided into three categories—above-the-line, production, and post-production—and most of the elements in each account are rated according to prep, shoot, and wrap (see Figure 4). The above-the-line costs include the producer, the writer, the director, and the cast. The production period includes the production staff, art direction, set construction, lighting, camera, sound, and others. The post-production accounts include the editing.

-FILM TITLE-		PRODUCTION COMPANY		REV. 01-01-1980		9.1	
2000 - PRODUCTION STAFF							
ACT	ACCOUNT NAME	FACTOR	QUANTITY	RATE	UNIT	TOTALS	
2001	PRODUCTION MANAGER		16	1502.00K		24,032	
	PROD MGR/STY		8	1700.00K		13,600	
	SCRIPT		8	214.00K		1,712	
	PRODUCTION FILE	4444		13,750.00	8	5,500.00	63,175
	FEES						
2002	FIRST ASSISTANT DIRECTORS		8	1445.00K		11,560	
	PROD DIR		8	1445.00K		11,560	
	SCRIPT		8	261.00K		2,088	
	PRODUCTION FILE	25136		17,750.00	8	4,438	625,350
	FEES						
2003	SECOND ASSISTANT DIRECTORS		2.4	588.00K		1,411	
	PROD MGR/STY		8	588.00K		4,704	
	SCRIPT		8	118.00K		968	
	PRODUCTION FILE	11071		13,750.00	8	3,438	
	FEES						
2004	HAIR STYLING		4	513.00K		2,052	
	HAIR STY AND STYLING A.L. (1041)		4	513.00K		2,052	
	SCRIPT		8	17,750.00	8	5,500.00	617,552
	FEES						

Figure 4: A portion of a dataMogul account sheet, with breakdowns for prep, shoot, wrap, and fringes.

music, publicity, and so on.

With budgeting software it's easy to extract variables in order to compare their costs and impact on the entire budget. You can also play around with different arrangements of prep, shoot, and wrap to arrive at the most cost-efficient budget.

One of the most hotly contested elements of the budgeting process is the calculation of the "fringes." Fringes are the percentage of wages added to the budget to reflect various taxes, pension and welfare, and other required union or guild payments.

Since they're calculated as percentages, the fringe accounts are sometimes used to hide money. Rachel Talalay, who designed the *P.M.* package, learned from experience that a budgeting program can detect such "creative bookkeeping." Last summer she came onto a major studio's \$15-20 million production as a computer consultant. When Talalay input the working budget, she found that the union fringes were calculated at 43 percent.

about double what they should have been. She recalculated the fringes, and the production manager took the new figures to the studio's budgeting department. The production manager had already had a few run-ins with the film's producers and the budgeting department. When he brought this up, they hemmed and hawed, and they arrogantly demanded to know just who was hired to redo the budget. Eventually, the studio was forced to accept the new figures, and the production suddenly had a lot more operating money.

Once the budget's been completed, you want some control over what you print and how you print it. There are a number of budget forms—20th Century Fox, MGM, Paramount, Universal, Columbia, Warner-Bros, TriStar, and the standard Enterprise Stations independent producer's form. Most of the budgeting programs are

capable of printing only one form when you purchase them. You choose which one you want delivered with the program,

Of all the businesses that need computerized number-crunching, the movie business is an absolute natural.

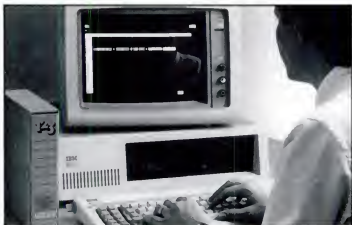
and budget forms for other studios can be purchased on separate disks. You can also customize the forms. For example, you might not want to print out every account in the budget. You might only want to see the active accounts, those that are operative in that particular budget.

"Of all the businesses that need computerized number-crunching capabilities, the movie business is an absolute natural," says Rupert Harvey, a *P.M.* user and independent producer of *Android* and *City Limits*. "As a producer, the more tools I can get to help me deal with the numbers, both in terms of money and timing, so much the better. Every penny counts. You want to get every cent you can up there on the screen."

"How much is your time worth?" asks Jack Smith. "Is your job setting up a budget format or is your job doing a budget? I could grow my own food, but I choose not to. It's the same thing with these dedicated software packages."

"Creative people don't want to deal in numbers," says Ron Frankel. "They don't want to be accountants. They want to make movies."

"Film budgeting," concludes Emil Safier, "is very similar to war." Considering what a film costs to produce these days, I suppose the casualties of losing a box office battle can be just as severe. ■



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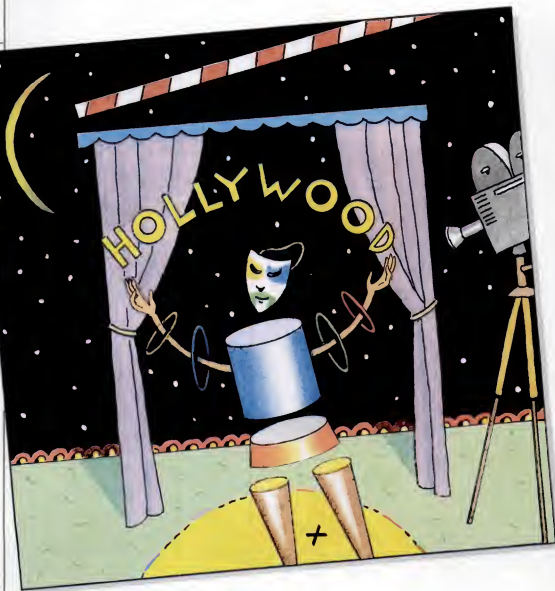
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The Toy Room at Digital Productions in Los Angeles is the home of the fastest, most powerful super-computer in the entire world: the Cray X-MP. A dual-processor version of its famous predecessor, the Cray-1/S, the X-MP has the kind of hard and heavy specs that boggle the minds of mere micro owners. Its clock cycle time is 9.5 nanoseconds; its computation rate is 400 million 64-bit floating-point operations per second. Fifteen or sixteen million dollars buys the whole shebang, which includes a generator room, on-site engineering support, and a VAX 11/782 (which allows you to communicate with the Cray).

The Cray X-MP at Digital Productions

has one more accessory: an IBM PC-XT; the combination of these two machines is likely to change the face of filmmaking.

Dreaming Animated Dreams

Digital Productions is the brainchild of Gary Demos and John Whitney, Jr. (son of John Whitney, the film effects pioneer and inventor of animated computer graphics), who are as responsible for the current state of the art in digital animation as any two men could be. Working together at Information International, Inc. (better known as Triple-I), they introduced computer animation to feature films in the early 1970s with special effects sequences they created for *Westworld* and *Futureworld*. They also did the tests that convinced Disney that *Tron* was possible.

ANIMATED DREAM

Whitney and Demos dreamed of computer animation so perfect that it deserved its own name: Digital Scene Simulation. To Whitney the distinction was a very important one.

"We take some care," he says, "not to call ourselves animators. We're simulators. We're not creating cartoons."

For Whitney and Demos, the challenge is to simulate photographic effects by creating computer graphics with resolutions and color complexities at least equal if not superior to feature film. They knew they'd need extraordinarily sophisticated hardware and software, faster and smarter than the tools they'd been working with. The Cray-1/S that they leased for \$180,000 a month when Digital Productions set up shop in an empty warehouse was just the ticket. It enabled them to quintuple the complexity of detail in their images while vastly reducing computer time.

Since 1982, Whitney and Demos' clients have included Sony, *PM Magazine*, AT&T, Eastern Airlines, and Mattel. For Fuji Videotape they generated a videocassette that was so fine the client refused to believe it wasn't a photo. For General Motors they produced a TV spot in which a Pontiac Fiero dissolved against a backdrop of fast-moving clouds.

A big step for Digital Productions was the release of its first major film project, *The Last Starfighter*. This Lorimar Production, released this year, features over 30 minutes of simulation, including every single space shot. No models, blue screen, or computer-controlled motion picture cameras à la *Star Wars* were involved. Just pixels and more pixels, cranked out in torrents from the Cray X-MP.

The Big Three

What can Digital Productions offer that can't be matched by conventional industry practices? And where does the PC fit in? With its high-speed data transmission channel, the Cray X-MP can produce special effects sequences more efficiently and more consistently than conventional techniques. But the right interface to make use



The Cray supercomputer.

of that high-speed channel doesn't exist—so Digital Productions called in an XT to design it.

According to Gordon Garb, the Digital Productions employee who first brought the XT on board, Digital Scene Simulation and the XT have three essential qualities in common: they are cost effective, flexible, and precise.

"One of our greatest advantages," says Garb, "is that we can tell you exactly what a certain kind of event, scene, or sequence is going to cost and how long it will take; then we can hit it dead center.

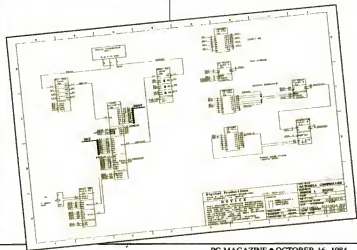
"The process used in traditional special effects entails a great deal of trial and error. 'Let's do this and light it that way and put a fog machine over there this time,' or 'No, blow it up this way, and we'll film it at high speed.' The people who do this sort of thing have developed some nifty tricks. But there are certain moves that are simply impossible to make using this technology.

"On the other hand, we can put our data into the computers, create a working model of a spacecraft, and do anything we want with it quickly and repeatedly. We can even examine our motions in real-time before ever committing them to film. This way, only stuff worth full simulation and shooting is done."

Calling in the PC

The Cray's high-speed data transmission channel is extremely fast; it is capable of sending out 600 million bits per second. At the moment it is going unused.

A preliminary schematic drawing produced by Gordon Garb, a PC-XT, and DASH-1 for the Cray XMP interface.



"We wanted to be able to take our pictures directly from the Cray," explains Garb, "without having to go through the VAX. The VAX is awfully slow, compared to the Cray. If we could use some other device to fully access the Cray's high-speed channel, bypassing the VAX entirely, we could theoretically pull pictures out of the Cray at a rate equal to our monitor's video refreshing cycle and get real-time full animation on the screen. But to do that we needed an interface that didn't exist, and that's why we bought the XT—to help us design that interface. A shop our size couldn't have taken on an engineering project of this magnitude otherwise. We would have had to hire an extra ten people and spend a year designing, fabricating, testing, and redesigning. Instead, with the XT, we finished in about a month."

Garb had seen a flyer for FutureNet's *DASH-I* schematic design software a few months before and shoved it in his filing cabinet (see "The PC Becomes an Electronic Draftsman," *PC*, Volume 2 Number 5). But he remembered it when Digital Productions' CAD (computer-aided design) needs arose and called the company, based in nearby Canoga Park, for a demo. A salesman dropped off a copy of the program for the weekend.

By Monday morning Garb was hooked. *DASH-I* was cost-effective, flexible, and precise. The only alternative wasn't really viable: spending \$15,000 on CAD software to run on the VAX and spending 2 months converting it from UNIX C to VAX C. "Instead, for the same amount of money that the VAX software would have cost us, we bought an IBM PC-XT with all the FutureNet graphics software and hardware included."

An additional bonus was the XT's portability. More than once the micro was placed on a rolling table and dragged into the Toy Room to sit next to the Cray itself, screen-to-plug, to troubleshoot the problems of the high-speed channel interface. That interface is still being refined. In the meantime, in keeping with the version of

Murphy's Law that says, "Useful functions for a new tool will pop up like mad the minute you've actually got the tool," the PC found more work to do.

For Posterity

Garb designed a camera controller card that enabled the XT to accurately control the shutter of a modified Mitchell camera. Its first task was to make a sped-up record of the installation of the Cray X-MP. For a full day, as engineers and technicians sweated the new 8.25-ton thinking machine into place on a reinforced floor, the XT calmly sent trigger codes to the Mitch-

object—spaceship, planet, or laser blast. Some scenes are quite complex and have scores of elements in them. In addition, we used many different software techniques to achieve the final image; it was vital to keep track of what sequences use what techniques, partly for scheduling. We asked *dBASE II* for all the shots with lasers, for example, so we could plan to shoot them at the same time. It was invaluable in helping us estimate filming time and meet our schedule."

The XT has been so helpful that Digital Productions has bought three more and plans to link the XTs and the VAX with Ethernet to form a loosely coupled system



An example of Cray-simulated graphics.

ell every 30 seconds, preserving the event in a dizzying stop-motion whirl. Since then, the XT-designed card has been applied to controlling photography of wireframe and vector-style computer graphics for commercial computer animation jobs not complex enough to justify using the Cray.

The XT has also helped Digital Productions keep costs down in unexpected ways. As Andy Davidson, the company's de facto database expert, explained: "We used *dBASE II* to keep track of all the elements that went into *The Last Starfighter*. An element might be a special effect or an

capable of passing files.

"We've got other ideas we're going to explore with the XT," Garb says, "as time and need dictate. Some employees are contemplating buying PCs with modems and using them as remote work terminals in their homes. And we may try using the CAD software for architectural and facility design."

The people at Digital Productions have already made their mark as miracle workers. With a range of tools as powerful and flexible as the Cray X-MP and the IBM PC-XT, there are undoubtedly more miracles to come.

PC-PLOT-III Enhances PC Output

For only \$95, PC-PLOT-III gives your computer a multiple personality, allowing it to emulate eight different terminal configurations for micro-to-mainframe communications.

In my office at the U.S. Census Bureau stands a Tektronix 4014 terminal with a 19-inch screen and 2048 × 2048 graphics resolution—all told, a pretty fancy graphics terminal. Next to the Tek sits a humble IBM PC with a Hercules board and a 12-inch Amdek 310A monitor with a resolution of 720 × 348.

When it comes to graphics, the Tek terminal outshines the PC system, yet the two act remarkably alike. Both can be used with the Census' UNIVAC mainframes to create and edit graphics at speeds up to 9600 baud; both can be used over the phone lines with SAS/Graph and with Bell Labs' S, two slick mainframe graphics programs; and both can generate high-quality

prints on a variety of plotters.

With *PC-PLOT* and a small sacrifice in the quality of the screen display and draft prints (the PC's dot matrix printer can't match the Tek's thermal copy unit), my PC stands up pretty well to its pricey deskmate.

PC-PLOT is a graphics terminal emulation program authored by MicroPlot Systems Company of Columbus, Ohio. This software allows the PC to function as a Tektronix 4010 graphics terminal, the smaller brother of the terminal we have at the Census. It is capable of performing with any mainframe graphics software that generates the Tektronix PLOT-10 data format and will drive either the Hercules graphics board, the IBM color/graphics



Illustration: *Troublers* by Wasily Kandinsky. Courtesy of Society Public Artwork

PC-PLOT-III

adapter, or the Plantronics Color Plus adapter.

At the same time, *PC-PLOT* is a full-featured communications program that operates very much like *PC-TALK* when it is not doing graphics. It has an on-line help menu, stores telephone numbers and log-on sequences, can auto-dial with the right modem, and uses Alt-key commands to perform most of the communication functions, including file upload and download. A look at the entries on the help menu (Figure 1), however, tells you that there are some things about this program that go way beyond *PC-TALK*.

Defining a Terminal Type

When you strike Alt-S to enter terminal setup mode, *PC-PLOT-III* presents you with a menu for choosing baud rate, parity, and output port (COM1: or COM2:)—the usual parameters a communications program needs to know. Once you have answered the queries, another menu pops up. Here you can really see that this is no ordinary communications program—two menu selections concern the GIN (graphics input) cursor, and another addresses screen resolution.

Even better, you get to decide if you want to emulate a Digital Equipment Corporation VT-100 terminal when you are not in graphics mode. This feature, somewhat hidden among *PC-PLOT*'s many talents as a graphics device, allows you to use the full-screen editing software on the host computer. Anyone who has ever edited with a terminal on a mainframe will gladly tell you why a line-oriented editor



PC-PLOT-III

MicroPlot Systems Company
2151 E. Dublin-Granville Rd., #205
Columbus, OH 43229
(614) 882-4786

List Price: \$95

Requirements: 96K RAM; IBM,
Plantronics, or Hercules graphics card.

CIRCLE 742 ON READER SERVICE CARD

[LOCAL CONTROL HELP MENU-ENTER <cr> OR COMMAND TO EXIT]

```
=====
ALT A LIST PHONE DIRECTORY      ALT U START UPLOAD
ALT B SEND BREAK                ALT V TOGGLE VT-100
ALT C UNUSED                    ALT W CLR SCR TO ALPHA
ALT D DISCONNECT LINE          ALT X TOGGLE PRINTER
ALT E LOCAL ECHO               ALT Y EXIT TO PC-DOS
ALT F OPEN HOST FILE           ALT Z COM DEBUG TOGGLE
ALT G REDIAL LAST NUMBER       ALT 1 SELECT COM1
ALT H HELP-THIS MENU           ALT 2 SELECT COM2
ALT I ACCEPT HOST DATA        ALT 3 SEL 320 X 200
ALT J DIRECTORY OF DISK        ALT 4 SEL 640 X 200
ALT L AUTO LOGON               ALT 5 SEL 720 X 348
ALT M DRAW PICTURE FILE        ALT 8 SELECT PALETTE 0
ALT N NO SCROLL                ALT 9 SELECT PALETTE 1
ALT O OPEN UPLOAD FILE         ALT K SEND NULL CHAR
ALT P ADD PHONE NUMBER         VT-100 KEYPAD
ALT Q CLOSE HOST FILE          <F1> <F2> <AF1> <AF2>
ALT R STOP UPLOAD              <F3> <F4> <AF3> <AF4>
ALT S TERM SETUP MENUS         <F5> <F6> <AF5> <AF6>
ALT T TERMINAL DIRECTORY       <F7> <F8> <AF7> <AF8>
ALT = CLEAR SCR TO GRAPHICS    <F9> <F10> <AF9> <AF10>
CTRL BREAK EXIT TO PC-DOS      NOTE <AF4>=ALT <F4>
```

Figure 1: *PC-PLOT*'s help menu.

just can't compare. The difference is much the same as using a true word processing package on the PC versus struggling with IBM's EDLIN program.

Thus, *PC-PLOT* allows the PC to emulate different types of terminals at different times. This is a nice feature, since a Tek 4010 terminal is very poor to work with in text mode. The Tek 4010 has a direct-view display and cannot be corrected by backspacing—all you can do is overwrite the mistake with new characters. This inability to erase characters on the display can quickly render the screen illegible. On the other hand, a VT-100 terminal is as good as anything around for handling text.

After selections are made on the second menu, a third appears. The most interesting entry here is whether you choose to partially emulate a Tektronix 4027 color terminal. You can create four-color plots in either IBM 320 x 200 or Plantronics' 640 x 200 resolution, or 16-color plots in Plantronics' 320 x 200 resolution. This selection is meaningless if you have the Hercules monochrome board, but the pro-

gram had good error-checking to prevent you from using the improper resolution or color choices. In all, you can define and store eight different terminal configurations for different host computers, baud rates, and output devices.

PC-PLOT shows one of its few rough edges, however, during the terminal definition step. Once you have made a menu selection, there is nothing on-screen to indicate it. At the end of each menu, you are asked "Are selections all correct <Y/N>?" How are you supposed to tell? And, if you do need to make a correction, you have to start over. This process would be much easier if menu choices were highlighted and you could move the cursor to edit incorrect entries. *PC-PLOT*'s shortcomings in this area were so great compared with the rest of the program that I called the manufacturer to find out if anything was wrong with my copy.

Reconciling the Resolution

All this talk about different screen resolution choices shows some of the flexi-

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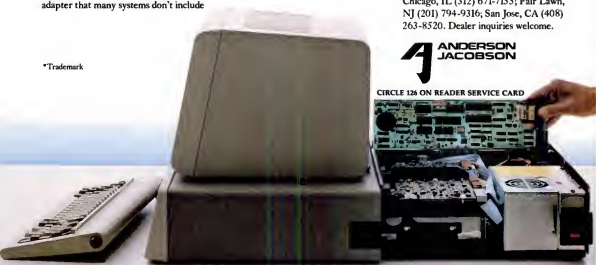
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PC-PLOT-III

bility in *PC-PLOT*. I tested the program with both the Hercules graphics card and the IBM color display adapter; in both cases the picture I got was very good given the resolution of the monitors. The mainframe software I used had no idea what was on my end; it simply assumed I had the Tektronix terminal specified while *PC-PLOT* acted as a filter between the mainframe and my PC.

Consider what was going on here. Figure 2 was produced when SAS/Graph assumed I had a Tek 4010 output device. It drew the graph and text to a 1024×780 screen resolution, but *PC-PLOT* intercepted the output and rescaled it to the Hercules 720×348 screen. Since I lost only about half of the vertical resolution, the printer dump routine produced a reasonably clear picture—I could get away with publishing it in an in-house document. The biggest problem was in plotting characters that, though once different, were simply too small to read on the IBM

PC-PLOT can download a picture image as well as text. Several plots can be saved in one file.

monitor.

Results were not as good on the IBM color display in 640×200 resolution. Almost every four Tek vertical points gets mapped to a single one on the IBM, and things get very fuzzy. Small characters are illegible and even overlaid (because of round-off problems). The printer dump gave me a picture that was useful only as a reminder of what I was trying to do.

Finally, I tried a four-color picture (in 320×200 resolution), by having SAS/Graph output to a Tek 4027 color terminal. When I used IBM's color palettes, the loss of resolution made even the line

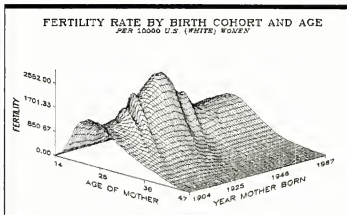


Figure 2: A three-dimensional plot from SAS/Graph was drawn on a PC with *PC-PLOT* and a Hercules graphics card and dumped to a dot-matrix printer.

graphics hard to look at.

Now, if I really wanted a color plot, I would not use the PC to produce the final copy—that's what the mainframe plotter is for. *PC-PLOT* does allow me to see how color enhances the plot, where I should put my graph titles and labels, and what symbols look good with the line graphics. In other words, *PC-PLOT* is very useful for designing graphics; it just can't produce them because of the screen's low resolution. I can test everything with the PC, get a quick hard copy on the printer, and pick up the production version tomorrow in the mainframe computer room. After all, you can't get blood from a turnip, and the PC's resolution is definitely a turnip compared to the Tektronix display.

Plotter Support

PC-PLOT has a nice feature for saving on connect time that also can be used to produce high-resolution graphics on a plotter—it can download a picture image as well as text! After defining a file and turning on the Receive function, the mainframe software is turned loose. As the picture is being generated on the screen, it is also being downloaded to the disk file. Several plots in one session can be saved

in one file, with a page break inserted between graphs.

When this is taking place, *PC-PLOT* is actually saving the instructions that produce the picture, not the dot image itself. These instructions can be reused to draw the picture again after hanging up the phone, or they can be reinterpreted for use on a different output device. Several utility programs come with *PC-PLOT* to make these things possible.

The DRAW utility program will reproduce the plot, using color if the original was produced by Tek 4027 emulation. The HPPLLOT utility program drives a Hewlett-Packard 7470A plotter and gives a picture good enough for all but the most demanding publication (Figure 3). The plotter produces a graph with 1024×1024 resolution (higher than the PC's display resolution because *PC-PLOT* reinterpreted the original picture instructions). Support is also included for running the IBM XY-749 and Houston DMP series plotters.

I also tried to redraw a color screen image with the single-pen plotter, which produced a weird surprise. Every time the plotter was supposed to write out text, it also wrote out some Tektronix language commands. *PC-PLOT* did not recognize

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them as commands and assumed they were labels or titles. This happened because I couldn't completely program the mainframe software. Tek 4027 commands should have been used only for screen color, and the actual plot instructions must be written in Tek 4010 format. SAS/Graph automatically generated the plot instructions, but entirely in Tek 4027 style. The plotter utility was not able to handle all that this entailed, since it was looking for 4010 commands.

System Requirements

PC-PLOT can be used with a minimal-ly equipped system; it requires only 96K RAM and a single disk drive. It requires either an RGB monitor capable of an 80-column display and either the IBM color/graphics adapter or the Plantronics Color Plus board, or a monochrome monitor capable of being run by the Hercules graphics card. I suspect the new AST monochrome graphics card, which is compatible with the Hercules card, can also be used.

Print dump routines are supplied for

popular dot matrix printers. These routines are specifically written for the display board being used and can be accessed by other programs. PC-PLOT supports a serial port configured as either COM1: or

Anyone who uses a PC and mainframe graphics software should include PC-PLOT in his program library. I consider it the best of the bunch.

COM2:, including those on multifunction boards. Of course, a modem is required for over-the-phone communication. If hard-wired communication at speeds over 2400 baud is desired, the host computer must support XON/XOFF.

There is only one version of PC-PLOT-

III, and it supports all three graphics boards (it will check the PC's equipment switches to see if your display adapter is compatible with the graphics resolution you are trying to use). I imagine it would also work as a nongraphics terminal with the standard IBM monochrome display adapter. In fact, PC-PLOT's VT-100 emulation capability makes it worth buying even if you do not have graphics.

PC-PLOT is organized as several programs, the most important being the communications module (PCPLOT3.COM) and the screen graphics driver (GRCOM3.COM), which are linked. The screen graphics driver is actually a device driver that attaches itself to the operating system when loaded and can be used to redraw a picture directly from DOS (Version 1.1 or later).

The documentation consists of Xerox copies of dot matrix printout, placed in a thin 6- by 8½-inch binder. Much of the manual deals with the technical aspects of graphics computing and VT-100 emulation, but it does include a good how-to section for setting up your program disk. It does not attempt to teach you how to use the mainframe software. The program is not copy protected, and the license agreement specifies use on a single CPU.

How do you sum up a program that is three communications packages in one, gives you drivers for three different plotters and eight printers, and has a list price of only \$95? I paid more than this just to get DEC VT-100 emulation. You have to admire MicroPlot Systems; it deliberately set the price low so that everyone could afford his own copy.

Anyone who uses a PC and mainframe graphics software should include PC-PLOT in his program library. I own three other communications packages and consider this the best of the bunch. ■

Patrick Thompson, formerly part of an American Statistical Association/Census Bureau Research Project, is a professor of management science at the Ohio State University in Columbus.

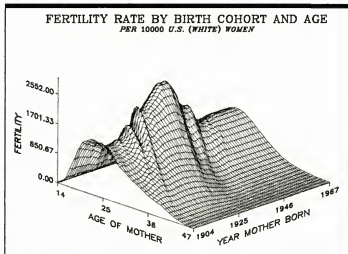
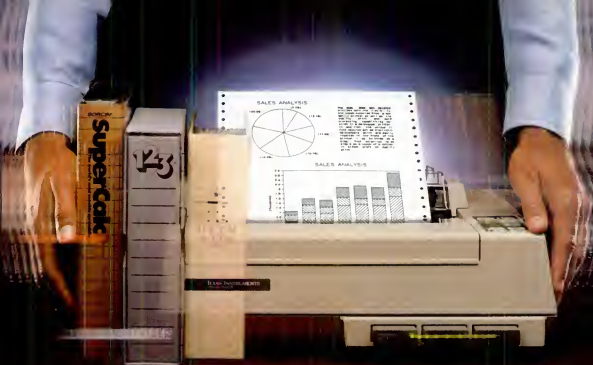


Figure 3: The plot shown in Figure 2, as reproduced on a Hewlett-Packard 7470A plotter. The Hewlett-Packard has a resolution of 1024 x 768, which matches the resolution on the Tektronix 4010 terminal screen.



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CIRCLE 104 ON READER SERVICE CARD

A personal financial statement is an essential part of any sound investment program and is relatively easy to prepare with a PC and a good spreadsheet program.

Calculating Your Net Worth

A personal financial statement can be one of your most valuable financial-planning tools. Unfortunately, most people don't like to think about money matters. They feel their incomes are too small or that financial planning takes too much time. But in fact, preparing a personal financial statement is a relatively simple process with a PC and a spreadsheet program such as Lotus' 1-2-3.

A personal financial statement is a simple record of your net worth and consists of two parts: a balance sheet and an income and expense statement. One asks the question, "What is my net worth?" The other asks, "Where does my money go?" The balance sheet, or net worth statement, is a profile of where you stand financially at any given point in time. It is the difference between your assets (what you own) and your liabilities (what you owe).

A calculation of your net worth is essential for any sound investment program. Anyone who has money to invest—no matter how small the amount—should plan his or her financial future. To do this effectively, potential investors must have a clear picture of their financial status.

You could sit down with any standard preprinted financial statement and, within 30

NET WORTH

minutes or so, calculate your net worth. But these standard forms lack one thing: they are not personal.

Most preprinted statements restrict you to the front and back of a single 8½-by-11-inch sheet of paper, which limits the

Anyone who has money to invest—no matter how small the amount—should plan his or her financial future.

items you can record. They are also inflexible because you can't combine the best parts of one form with another. Constructing your financial statement on a computer, however, makes it easy to personalize your statement and to change and modify it as your needs change.

Money Matters

To begin constructing your personal financial statement, first calculate, as accurately as possible, the market value of your property, home, auto(s), and investments. To find out what these assets are worth, check local newspapers advertising comparable homes and merchandise. Your daily newspaper will tell you what your stocks, bonds, money market accounts, and mutual funds are worth. If you own an unlisted investment (for example, in real estate or oil and gas limited partnerships), check the latest annual report for the current value of the asset. Or, if that's not possible, value the asset at cost.

To determine what your liabilities are, first list all outstanding bills and credit card charges. Next list unpaid balances on your home, car(s), vacation vehicles, and other loans. Total the assets column, then the liabilities column. Now subtract your liabilities from your assets. The result is your net worth.

Now that you have gathered this financial information, look at the examples presented in Figures 1 and 2. Study these examples and use them as a guide to pencil out your own personal financial statement.

Don't worry about how crude it looks at first, or what you might have left out. The beauty of a computer is that you can revise entries in your statement. In fact, it's expected that your financial profile and goals will change over the years.

Put as much detail as you like into your statement. Most preprinted financial forms do not allow much room for detail. But with the PC, you can customize your statement as you like. In fact, you can have different versions of your financial statement for separate purposes. One version could be for your banker, another more detailed version could be for your investment adviser. You want to end up with a simple, personalized document that is easy to read and easy to use.

Constructing the Worksheet

The personal financial statement is easily constructed with Lotus' 1-2-3, but any spreadsheet program will do the job. The sample statement shown in Figures 1 and 2 was created with 1-2-3, and the instructions that follow refer to that program's command structure.

The statement is divided into two pages. The first page summarizes all the detailed information contained in the supplementary schedules. You may have as many supplementary schedules as you like. Using a spreadsheet will make it easy to tie the supplementary totals back to your summary page.

You will be constructing your own personal financial statement down the length of your spreadsheet, with the first page at the top of your spreadsheet and all supplementary schedules appearing below. This format allows for maximum flexibility. I have experimented with placing financial statements side by side, but without success. I have found that the format takes an inordinate amount of planning and re-

stricts you from inserting and deleting rows.

I recommend double-spacing between major categories on the first page of your personal financial statement to make it easy to read. I also suggest that titles and heading information be entered in capital letters and that all detailed information be in lowercase letters.

To begin designing your personal financial statement, set the global column width to 12 characters with the command

Worksheet Global Column-width 12

Next type in your heading information as illustrated in Figure 1. A quick way to enter and align this information across several cells is to first type in the heading information as one long field. Then go back in edit mode by pressing the F2 key and align the information by inserting and/or deleting blanks in front of each heading line until the form appears just the way you want it.

Most preprinted financial forms do not allow much room for detail. But with the PC, you can customize your statement just as you like.

If your telephone number or address begins with a number, be sure to start the label with a single quotation mark. This will identify the contents of the cell as a label and not as a value to be calculated. Another helpful tip to remember is that when you enter your column titles (such as ASSETS, AMOUNT, LIABILITIES, AMOUNT), center them over the columns using the /Range Label Center com-

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T337

NET WORTH

PERSONAL FINANCIAL STATEMENT AS OF SEPTEMBER 25, 1984

James T. Somebody
Judy R. Somebody

500 Elmwood Parkway
Anytown, USA 94123
(465) 555-4321

ASSETS		AMOUNT	LIABILITIES		AMOUNT
CASH			CURRENT BILLS		
Cash on hand	200		Mortgage or rent	550	
Checking accounts	750		Charge accounts	150	
Savings accounts	1,250		Credit cards	1,250	
Money market funds			Alimony/child support		
Life Insurance cash value			Other bills		
MARKETABLE SECURITIES			LOANS		
Stocks	6,500		Auto	5,000	
Bonds			Education		
Government securities	3,000		Other loans	5,500	
Mutual funds					
NON LIQUID INVESTMENTS			MORTGAGES		
Real estate: home	110,000		Home	30,000	
Other properties	35,000		Vacation property	21,000	
IRA or KEOGH	5,500		Other properties		
Equity in business					
PERSONAL PROPERTY			TAXES DUE		
Automobiles	12,000		Federal		
Household furniture	15,000		State		
Collectibles	1,000		Local		
Other	10,000		Other		
TOTAL ASSETS	200,200		TOTAL LIABILITIES	63,450	
			NET WORTH	136,750	
ANNUAL SOURCES OF INCOME			PERSONAL INFORMATION		
SALARY: James	31,000		OCCUPATION	AGE	
NET INCOME: Judy	15,000		James: Executive	40	
OTHER INCOME	1,000		Judy: Decorator	38	
INTEREST	300				
DIVIDENDS	400				
TOTAL INCOME	47,700		MINOR CHILDREN: 2	4 AND 7	
CONTINGENT LIABILITIES			GENERAL INFORMATION		
AS ENDORSER OR CO-MAKER?	No		ANY ASSETS PLEDGED?	No	
			DEFENDANT IN ANY SUITS?	No	
			EVER TAKEN BANKRUPTCY?	No	
THE UNDERSIGNED CERTIFY THAT THE INFORMATION HEREIN IS TRUE AND ACCURATE AS OF THIS DATE.					
DATE _____			SIGNATURE _____		
			SIGNATURE _____		

Figure 1: Summary of assets and liabilities derived from supplementary schedules.

SUPPLEMENTARY SCHEDULES AS OF SEPTEMBER 25, 1984

James T. Somebody
Judy R. Somebody

500 Elmwood Parkway
Anytown, USA 94123
(465) 555-4321

SCHEDULE A: CASH AND BANK ACCOUNTS

BANK NAME	LOCATION	HELD BY	ACCT NO.	AMOUNT
First National	San Francisco	Husband	198748-67	500
West Coast Bank	San Mateo	Wife	20987-667	250
First S&L Association	San Mateo	Joint	1-15257-03	1,250
Cash on Hand		Joint		200
TOTAL CASH ON HAND =				\$2,200

SCHEDULE B: STOCKS, BONDS, AND OTHER SECURITIES

DESCRIPTION	DATE	HELD BY	#SHRS	COST	MKT VALUE
US Government Securities	18-Feb-82	Joint	100	5,000	3,000
Exxon	24-May-79	Joint	100	3,500	4,000
Mobil Oil	27-Aug-83	Joint	100	1,000	2,500
TOTAL MARKET VALUE =					\$9,500

SCHEDULE C: IRA AND KEOGH ACCOUNTS

DESCRIPTION	DATE	HELD BY	#SHRS	COST	MKT VALUE
Dreyfus Group	09-Jun-82	Joint	200	2,000	3,000
Bank CD's	18-Jan-84	Joint	10	2,000	2,500
TOTAL MARKET VALUE =					\$5,500

SCHEDULE D: REAL ESTATE

DESCRIPTION	DATE	HELD BY	COST	MORTGAGE	MKT VALUE
Residence	08-May-76	Joint	50,000	30,000	110,000
Vacation Cabin	02-Feb-79	Joint	25,000	21,000	35,000
TOTAL =			\$75,000	\$51,000	\$145,000

SCHEDULE E: LIFE INSURANCE

INSURED	POLICY	BENEFICIARY	INSURANCE CO	FACE AMOUNT
James T. Somebody	Term	Wife	Prudential	150,000
Judy R. Somebody	Term	Husband	ConnGeneral	50,000
TOTAL =				\$200,000

SCHEDULE F: FINANCIAL CREDIT INFORMATION

NAME OF INSTITUTION	DATE	PURPOSE	ORIG AMOUNT	BALANCE
Credit Union	21-Mar-81	Sailboat	10,000	5,500
West Coast Bank	09-Jun-82	Honda '82	9,000	5,000
TOTAL =				\$10,500

Figure 2: Supplementary schedules detailing assets and liabilities. Any changes in dollar amounts made here will automatically be reflected in the first-page summary.

NET WORTH

mand. Add the horizontal dotted lines by typing \- into the appropriate cells of column A. The backslash causes whatever character is typed to be repeated across the column. You can then use the /Copy command to copy the dotted lines across the rows to column G.

Now the most important action of all: save your spreadsheet using the /File Save command. This backup procedure should be done every few minutes.

Next enter the titles of your assets and liabilities and their amounts. Lotus' 1-2-3 offers a wide variety of formats with the /Range Format command. Round off all amounts entered to the nearest hundred and format all dollar-amount fields with commas (not with decimals). For clarity, I recommend that dollar signs be used only on your second page to highlight the individual schedule totals.

You might also want to put in probable future assets and liabilities, for example, education loans. Don't worry if part of your spreadsheet moves off the screen; it can be adjusted later to print on a single page. Try to line up related assets and liabilities. For example, when you enter real-estate assets, cross over and enter mortgages. This provides a nice touch and

Try to line up related assets and liabilities. This provides a nice touch and makes your statements easier to read.

makes your statement easier to read.

Total your assets and liabilities using the @SUM function, then put the cursor in the NET WORTH cell and enter your formula for NET WORTH (for example, $\text{NET WORTH} = \text{ASSETS} - \text{LIABILITIES}$). Now go back and test your spread-

sheet by changing your asset and liability amounts to make sure your NET WORTH is correctly recalculated.

Supplementary Schedules

Now we are ready to work with the bottom half of the first page of your personal financial statement. Enter your annual sources of income, personal information, contingent liabilities, and general information. Type in this information as one long field and line it up afterward in edit mode. (If you have contingent liabilities, you may require a separate schedule with additional information.) Allow room at the bottom for at least two signatures and a date.

It is a good idea to set up range names for the first page and later for the supplementary schedules using the /Range Name Create command. This will make it easier to go between your first and second pages, and 1-2-3 will automatically expand the range when a new row is inserted.

Now print the first page of your financial statement, using the /Print Printer Options Margins command to set your left margin at 3 and the right margin at 80. Does it all fit on one page? If not, delete some blank rows. Does it wrap around because the paper width is too narrow? Try resetting your left margin to 0 and increasing your right margin to 85.

Use the /Move command to reposition your assets and liabilities and to make any changes necessary to make your statement look better. Remember, someday an experienced loan officer will scrutinize this statement, and first impressions count.

Now you are ready to construct your supplementary schedules. To begin, press the F5 key and go to A100. Use the /Copy command to copy down the heading information from the top of your first page. Then edit the headings to read "SUPPLEMENTARY SCHEDULES."

Schedule A should contain all of your cash and banking information, including savings and loan association, credit union, and money-market accounts. I like to include account numbers because it allows

quick reference when a loan officer needs to check the current status of an account.

Enter your formula for total cash on hand and note the cell numbers for the individual categories of cash. Now go back to your first page and enter those cell

As your major assets change, it is important that you rerun your financial statement.

numbers in the corresponding row and column (for example, for checking accounts enter +G110+G111). The correct amounts should appear on your first page. If not, go back to Schedule A and check the cell number containing the amount in question.

Continue working your way down the supplementary schedule. Be sure to note the cell containing the category amount and enter that cell's number on the corresponding line of your first page. Now your financial statement will automatically reflect your detailed supplementary schedules. Also, remember to save your spreadsheet after completing each schedule.

When you finish, print your supplementary schedule to make sure it fits on one page. If not, simply divide it into two parts and number them accordingly. You can have as many supplementary schedules as you want, and you can even construct and print one for each member of your family.

Keeping Score

One final note: You need not redo your personal financial statement every week or month. But as your major assets change, it is important that you rerun your financial statement to keep it up to date. You should also review it critically at least once a year to make sure you are moving toward your financial goals. ■

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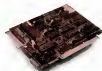
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Performing Linear Regressions With 1-2-3

Although 1-2-3 isn't set up to perform linear regressions, a little ingenuity can coax it into churning out these useful equations on any data you desire.

Lotus Development Corporation's 1-2-3 can manipulate data in many useful ways, but it can't perform linear regressions on its own. Linear regressions are equations that estimate the degree of linear relationship between two sets of variables. They also indicate the equation of the line along which the variables are related. If the variables are sufficiently related, the linear equation produced by the regression can be used to predict the probable value of the dependent variable based on the known value of the independent variable. Fortunately, with a little ingenuity, you can overcome 1-2-3's resistance to performing these use-

ful, statistical calculations.

Suppose, for instance, that you were interested in the relationship between the lengths of two bones in fetuses: the femur (thigh bone) and the humerus (arm bone). To conduct your study, you might use ultrasound to measure these two bones in a series of, say, 200 fetuses. That would provide you with 200 pairs of data for femur and humerus length. Just writing these data pairs down in a long list, however, would not be very useful (see Figure 1). Glancing at this list offers few insights into the relationship between the two variables.

A graph representing the femur (the

first variable) on one axis and the humerus (the second variable) on the other axis would be far more helpful. Typically, you plot the first variable on the horizontal, or x-axis, and, the second variable on the vertical or y-axis. The fetus data would produce the graph shown in Figure 2. It's obvious why this kind of graphic rendition is called a "scatter diagram." 1-2-3 can produce this kind of diagram directly.

Curve Fitting

But while scatter diagrams help demonstrate that there is, indeed, a relationship between the size of the femur and the size of the humerus in the fetuses, they

LINEAR REGRESSIONS

Fe	Hu	Fe	Hu	Fe	Hu	Fe	Hu
9	10	34	33	56	49	63	58
10	10	35	33	56	51	64	54
10	12	36	35	56	52	64	55
11	8	36	35	56	52	64	56
11	12	37	35	56	52	64	57
12	12	37	36	56	55	64	58
13	11	37	36	57	48	64	60
13	13	37	37	57	50	64	60
15	17	37	40	57	52	65	51
16	17	38	34	57	52	65	52
16	17	38	39	57	54	65	53
16	18	39	36	58	49	65	56
17	18	39	36	58	52	65	59
18	18	39	37	58	53	65	59
18	19	39	38	58	54	66	57
20	20	42	41	58	54	66	58
20	20	42	41	58	55	66	63
20	25	43	42	59	45	67	63
21	19	44	37	59	50	67	62
21	23	45	39	59	50	68	55
22	21	45	44	59	51	69	53
22	22	46	43	59	51	69	56
22	24	46	45	59	53	69	64
22	24	46	47	59	53	71	60
23	22	47	48	59	54	71	62
23	26	48	46	59	54	71	64
24	22	48	47	59	56	72	65
24	26	49	45	60	51	73	61
24	26	49	50	60	51	73	69
24	27	50	45	60	52	74	65
25	27	51	48	60	54	75	62
25	27	52	49	60	55	75	63
26	22	52	50	60	55	76	59
26	24	53	42	60	55	78	69
26	26	53	49	60	56	79	71
26	26	53	50	60	56	81	67
26	27	53	50	60	56		
26	28	53	50	60	60		
27	26	53	53	61	51		
27	26	53	54	61	51		
27	28	54	48	61	52		
27	31	54	48	61	52		
29	29	54	50	61	53		
29	31	54	50	61	53		
29	31	54	50	61	54		
30	29	54	50	61	55		
31	26	54	50	62	52		
31	28	54	52	62	54		
31	29	54	54	62	54		
31	30	55	49	62	55		
32	29	55	50	62	55		
32	32	55	50	62	57		
32	36	55	50	62	59		
34	31	55	53	62	60		

Figure 1: A list of 200 data pairs showing femur and humerus length in fetuses.

can't provide a complete understanding of that relationship. The diagram in Figure 2, for example, does not allow you to look at the size of a femur and predict the size of the corresponding humerus. To do that,

Linear regressions perform the simplest kind of curve fitting: they fit straight lines.

you would need an equation that describes the relationship between the two variables mathematically. The statistical procedure that produces such an equation is called "curve fitting." Linear regressions perform the simplest kind of curve fitting: they fit straight lines. The general equation for a straight line is:

$$y = a + bx$$

where y is the predicted variable (the humerus in our example), x is the observed variable (the femur), and a and b are the two coefficients to be discovered by the linear regression. The details of the mathematical procedure involved in fitting curves to data can be found in many textbooks. *Statistics in Medicine* by Theodore Colton (Little, Brown, 1975) contains a good explanation on pages 189-217, but watch out for the typo on page 201 (the last denominator at the end of the formula should be raised to the second power). For now, however, a discussion of how to implement the established mathematical formulas will be sufficient.

The first step is to introduce the data. Create a clean worksheet by starting /J-3 from scratch or by using the Worksheet Erase Yes command sequence (/WEY). Place the title "FE" (for femur) in the A1 cell and set the column width to four characters by entering the command /WCS4. Similarly, enter "HU" (for humerus) in the B1 column, again using /WCS4 to set the width. Then, to separate the titles from the data, go to A2 and enter \=. You

LINEAR REGRESSIONS

extend the data separator across your worksheet with the Copy command (/C) and specify A2 as the range From, and A2..N2 as the range To.

Now you're ready to enter the data pairs into columns, beginning with A3 and B3. Keying in the 198 pairs of femur and humerus lengths contained in Figure 1 is a thankless task, but it must be done if you want to duplicate the figures calculated in this article. You can lighten the job by using a utility such as *ProKey* to create temporary macros, redefining the gray minus key (-) as a right arrow, and the gray plus key (+) as a down arrow followed by a left arrow. If you insist on abridging the database, don't just use the first few and last few pairs: select at least every fifth data pair. This will ensure that the regression covers a broad range.

Don't forget to protect what you have entered by saving it to disk every few minutes. In this case you would save your work and give it a filename simply by typing /FSLIN REGR. On each subsequent save you'll be asked: Cancel or Replace, to which you reply either by selecting the highlighted Replace or by typing R.

After entering the data pairs, the next step is to go to cell G3 and type = n, followed (in G4 through G20) by the series of equates shown in Figure 3. These

If you insist on abridging the database, don't just use the first few and last few pairs. Select at least every fifth data pair.

identify upcoming calculations in the corresponding F3 through F20 cells, but additional formulas must first be entered, or cells will begin to fill with error messages.

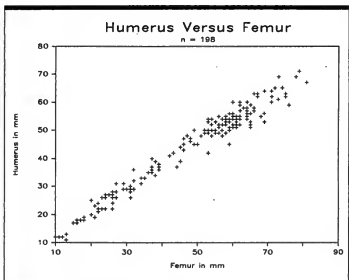


Figure 2: A scatter diagram of the data in Figure 1.

As you noticed while entering the information from Figure 3, the calculations require the sums of x^2 and y^2 , and the product of x and y . Columns L, M, and N will be used to hold these calculations. In cell L1, then, enter the identifying label x^2 ; put y^2 in cell M1; and type $x*y$ in N1. Now, dropping down to Row 3, enter $+A3^2$ in cell L3, $+B3^2$ in M3, and $+A3*B3$ in N3. At this point, you can use the Copy command to fill in all the calculations for each column for as many data pairs (rows) as you had patience enough to type in earlier. With the highlight on L3, for example, type /C and enter L3 in response to the From request, and L3..L200 (or however many you have) in response to the To request. It will take only a few seconds for 1-2-3 to calculate the results. Repeat this procedure for the M and N columns. (Experienced 1-2-3 users may choose to use the Range Name Create /RNC command instead of the Copy command—in some ways it's easier—but the copy procedure is perfectly adequate for a small database such as this.)

Before proceeding to the final steps of the regression calculations, users equipped with either a graphics monitor or a Hercules (or equivalent) monochrome graphics card might want to relax a moment by graphing the scatter diagram of column B onto column A. To do this, select the XY option after typing /GT (the Graph Type command). You then select the x-axis (horizontal) for the first variable with the /GX command. The /GB command places the second variable on the y-axis. Entering /GOF keeps 1-2-3 from tracing lines between your data points, and the program displays the menu Graph A B C D E F. Point the cursor at B (the best symbol to use) and hit the Enter key. Another menu appears offering you the choice of Line, Symbol, Both, or Neither, and you simply select Symbol and hit the Enter key again. Now type /GV to view the graph. The resulting display (the scatter diagram) is well worth seeing.

You can give your graph a title (LINEAR REGRESSION) with the /GOTF command sequence. With /GOTS you can add a second title (enter /F3, to indicate the

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CIRCLE 111 ON READER SERVICE CARD

LINEAR REGRESSIONS

number of cases in your example). A title for the x-axis is introduced in the same way: /GOTX and \AL; the y-axis is identified with /GOTY and \BL. When you use this worksheet for computing linear regressions with other parameters, the titles will automatically be updated along with the graphs.

Linear Regression

The time has come to proceed to the linear regression by filling in the missing rows in column F. The chart below indicates what should be entered (with the Lotus calculating function-sign @, as indicated) for each of the F cells:

F-cell	Type
F3	@COUNT(A3..A200)
F4	@SUM(A3..A200)
F5	@SUM(B3..B200)
F6	@SUM(L3..L200)
F7	@SUM(M3..M200)
F8	@SUM(N3..N200)
F9	@AVG(A3..A200)
F10	@AVG(B3..B200)
F11	+F6-F4^2/F3
F12	+F7-F5^2/F3
F13	+F8-F4*F5/F3
F15	+F13/F11
F16	+F10-F15*F9
F17	+F13/@SQRT(F11*F12)

When entering this information, remember to use the plus sign (+) where indicated, and do not put any spaces between the items on which calculations are being made.

When you have made these calculations, you will have finally arrived at the equation for the line describing the relationship between femur length and humerus length: $y = F16 + F15 \cdot x$. You can use this equation to go back and predict the value of y (the humerus bone) for each x (femur bone) value. You can then compare the predicted values with the observed values.

To do this, enter 'PredictedY as a label in C1, then drop down to C3 and enter +F16+F15*A3. After a short

	F	G	H	I	J	K
1						
2						
3		198 = n				
4		9437 = Sum of x				
5		8662 = Sum of y				
6		513165 = Sum of x^2				
7		422278 = Sum of y^2				
8		464377 = Sum of x*y				
9		47.66161 = x mean				
10		43.74747 = y mean				
11		63382.32 = Sum of x^2 - ((Sum of x)^2)/n				
12		43337.37 = Sum of y^2 - ((Sum of y)^2)/n				
13		51532.08 = Sum of x*y - (Sum of x)*(Sum of y)/n				
14						
15		0.81 = Slope b				
16		5.00 = Intercept a				
17		0.983 = r (coefficient of correlation)				
18						
19						
20		2.7105 = SD of points about the fitted line				

Figure 3: A series of equates identifying calculations in cells F3 through F20.

wait, 1-2-3 answers 12. While it might be tempting to use the same copy procedure used earlier for columns M, N, and L to fill in all the values for C, one procedural change must be made. You want the addresses F15 and F16 to be absolute rather than relative, so go back to C3 and enter the editing mode by hitting Function Key 2. Change the formula to read

$$+ \$F\$16 + \$F\$15 * A3$$

The /C can now copy this formula throughout the C column, from C3 to C3..C200.

Users equipped with graphics can now update their graphs with the /GA command by typing the range C3..C200. To distinguish the new dots from the original data, enter the /GOFA command, point the cursor at the Line option in the menu, and hit the Enter key. The predicted value (y) will be represented by a continuous line without associated symbols. Type QV to view the updated graph.

Powerful Tool

You have created a powerful tool that allows you to predict the value of the second variable based on a given value of the

first variable. But there's more to it. The next question is: how close to this predicted value can you expect the observed value to fall? That is, just how good is the prediction?

The accuracy of the prediction is determined by the coefficient of correlation, held in cell F17. This coefficient, r , measures the strength of the relationship between the regression line and the data pairs. The closer r is to one, the more closely the data pairs will tend to conform to the regression line. The closer r comes to zero, the more the plotted data will resemble an amorphous cloud. To test this, try changing the data in column A or B by inserting a value two or three times larger than the current one. The newly created dot will fall far outside the range of other dots on the graph. Hit the F10 key and you will see the value in cell F17 decrease.

Now you're ready to deal with the question of confidence limits. They control the certainty with which you can say that the observed value will fall within a given range of the predicted mean value (produced in column C). The size of this range is expressed in standard deviations,

LINEAR REGRESSIONS

so you must first compute the standard deviation of the points around the regression line. Start by defining cell F20:

F20 is $\text{@SQRT}((1/(F3-2))* (F12-(F13^2/F11)))$

Obviously, the size of this range will determine how likely the observed value is to fall within it. For the data considered here, a range of plus or minus 1.66 standard deviations would encompass 90 percent of the observed values, leaving a 10 percent chance that a correct value might fall outside the acceptable range. If you can live with that large of a margin of error, use the 1.66 factor in the next calculation. If you desire a stricter standard, leaving only 5 percent of correct observations outside the range, the size of the range would have to be increased to plus or minus 1.98 standard deviations. You can have more confidence in the wide range, but it is less precise. (For a complete description of the meanings and applications of these terms and factors, consult a statistics textbook.)

With cell F20 defined, go to cell D1 and type the label 2.5, which represents the 2.5th percentile. Next, go into cell D3 and type this formula:

$+C3-1.98*(\text{@SQRT}(\$F\$20^2 * (1+1/(\$F\$3+(A3-\$F\$9)^2 /(\$F\$10))))$

Be sure to include the correct number of parentheses or 1-2-3 will beep at you. Again, note use of the dollar sign (\$) to indicate absolute reference. Next, copy D3 into D3..D200 to return to the lower percentile.

Repeat the process and define cell E1 as 97.5. The formula to be introduced in E3 will be the same as the one in D3, except that the first minus sign (-) is replaced with a plus (+) sign:

$+C3+1.98*(\text{@SQRT}(\$F\$20^2 * (1+1/(\$F\$3+(A3-\$F\$9)^2 /(\$F\$10))))$

Do not copy the contents of cell D3 into E3. That would change the value of relative cells such as C3 and A3 into D3 and

B3! Retype the formula as indicated. When this is done, copy the contents of E3 into E3..E200.

That's it. You're all done. To put some icing on the cake, update the graph by including the two new columns, D and E, with the procedure used for column C. This time add the new ranges in C and D as well as the /G prompt (see Figure 4).

A Template

After all that work, it would be a pity to junk this worksheet. Instead, save it again under a different name. Error messages

You can use the template with just about any data that you desire.

will appear in every cell that held a computed value, but that's all right. Save this "template" under the LIN__ REGR name. The next time you need to compute a linear regression, just define the numbers that you want to calculate in your worksheet, give them a name, save the worksheet, call the LIN__ REGR worksheet, issue the /FCN command, and answer 1-2-3's question of which names in which worksheets you want to combine. Using the template avoids having to export data to statistical programs and cuts the time to obtain the answer.

You can use the template with just about any data you desire, even the thickness of *PC Magazine* against the number of the issue. Just remember, predictions are reliable only with a high coefficient of correlation r ; it is very dangerous to use this curve to predict events outside the range of observed values. If you apply the equation of your son's growth against his age, it may predict that by the time he's 78, he will be 10 feet tall! ■

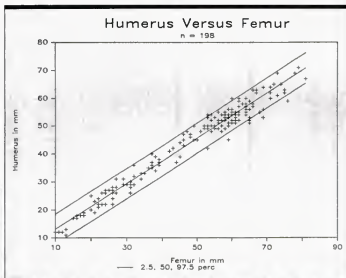


Figure 4: An update of the scatter diagram in Figure 2, this time showing the regression line and the two confidence-limits lines.

P. Joubert is a doctor of medicine in the OB-GYN department at Yale University.

A 1.2.3 MACRO For Investors

The 1-2-3 macro described here calculates internal rate of return and can work with any financial model to analyze individual or combined investments.

One of the most important assets of Lotus' 1-2-3 is its powerful macro feature, which allows you to create sections of a spreadsheet or entire worksheets with only two keystrokes. This article explains how to create and use an internal rate of return (IRR) macro, or subroutine, that is easily incorporated into any 1-2-3

model. Figure 1 shows the IRR macro and briefly describes what each line of the macro does. This macro produces the output in Figure 2 when you strike the letter assigned to the macro while holding down the Alt key. Because I assigned the letter A (for Analysis) to the macro in Figure 1, it is invoked with the Alt-A key combination.

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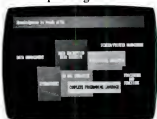
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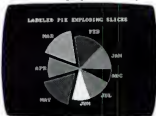
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MACRO

1. /WGC10~/WCS30~/WGFC2~(GOTO)B1B~/RFP1~(GOTO)K19~/RFP1~
 2. (GOTO)F7~Return On Investment Section~
 3. (GOTO)A9~Initial Cash Outlay(RIGHT)~(7)~
 4. (GOTO)B11~Period 01(RIGHT)Period 02(RIGHT)Period 03(RIGHT)Period 04(RIGHT)Period 05(RIGHT)Period 06(RIGHT)Period 07(RIGHT)Period 08(RIGHT)Period 09(RIGHT)Period 10
 5. (GOTO)A12~Sum Of Cash Outflows(RIGHT)~(7)~/Cb12~c12..k12~
 6. (GOTO)A13~Sum Of Cash Inflows(RIGHT)~(7)~/Cb13~c13..k13~
 7. (GOTO)B14~ -----/Cb14~c14..k14~
 8. (GOTO)A15~Net Cash Flow(RIGHT)+B13-B12-B9(RIGHT)+C13-C12~/Cc15~d15..k15~
 9. (GOTO)A16~Cumulative Cash Flow(RIGHT)+B15(RIGHT)+B16+C15~/Cc16~d16..k16~
 10. (GOTO)A18~Estimated Rate of Return(X)~(RIGHT)..30~
 11. (GOTO)A19~Calculated Rate of Return(IRR)~(GOTO)K19~@IRR(B1B,B15..K15)~
1. Set column widths and worksheet formats
 2. Title
 3. Input initial cash outlay
 4. Column headings
 5. Input the row/column where the total cash inflows from all investments are located
 6. Input the row/column where the total cash outflows from all investments are located
 7. Underscore
 8. Compute net cash flow
 9. Compute cumulative cash flow
 10. Input best estimate of what the computed rate of return will be (30% is default value)
 11. Compute the real IRR

Figure 1: Listing for the 1-2-3 macro calculating internal rate of return and a description of what each line of the macro accomplishes.

Initial Cash Outlay		Return On Investment Section Investment A & B										
	\$300.00	Period 01	Period 02	Period 03	Period 04	Period 05	Period 06	Period 07	Period 08	Period 09	Period 10	
Sum Of Cash Outflows	\$400.00	\$220.00	\$10.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
Sum Of Cash Inflows	\$20.00	\$20.00	\$120.00	\$70.00	\$70.00	\$90.00	\$110.00	\$120.00	\$60.00	\$50.00		
Net Cash Flow	(\$220.00)	(\$20.00)	\$110.00	\$70.00	\$70.00	\$90.00	\$110.00	\$120.00	\$60.00	\$50.00		
Cumulative Cash Flow	(\$220.00)	(\$220.00)	(\$212.00)	(\$143.00)	(\$73.00)	\$17.00	\$127.00	\$247.00	\$327.00	\$377.00		
Estimated Rate of Return(X)	30.0%											
Calculated Rate of Return(IRR)												16.8%

Figure 2: Output of the macro shown in Figure 1.

Creating the Macro

You load the macro into a spreadsheet by typing the keystrokes into a cell or column of cells. Continuations of the macro must be in the same column and directly below the previous macro commands. For instance, if you start the macro in A2001, it must be continued in A2002 and so on. You may use any number of connecting cells. I stored the macro in Figure 1 in cells A2001 through A2011 and the descriptions in cells B2001 through B2011.

You must use certain conventions for telling 1-2-3 how to move the cursor. For instance, including the command (GOTO) in a macro has the same effect as striking the F5 function key, and using the com-

mand {UP} {UP} moves the cursor two rows up. (Refer to page 109 in the 1-2-3 user manual for more details on the conventions used for cursor movement and other macro-invoked commands.)

Once the keystrokes are loaded, a macro range name consisting of a reverse slash and a single letter of the alphabet is assigned to the cell at which you start the macro. You can then invoke the macro any time you need it by pressing the letter of the alphabet assigned to the macro while holding down the Alt key.

Using the Macro

You can put this feature to many practical uses. For example, suppose you are

evaluating the pros and cons of investing in two tax shelters. Each investment requires a down payment and cash "inflows" and "outflows"—additional payments and returns—of varying amounts and at various times. Since, with inflation, a dollar today is worth more than a dollar tomorrow, you will compute the internal rate of return of each investment to take this "time value of money" into consideration when you compare the relative worth of each investment. Your decision to accept or reject each investment will be based on a minimum requirement of 15 percent return on investment.

Investment A requires a down payment of \$200. It also requires you to put in \$30



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MACRO

Investment Section											
Investment A	Period 01	Period 02	Period 03	Period 04	Period 05	Period 06	Period 07	Period 08	Period 09	Period 10	
Down Payment	\$200.00										
Cash Paid Out	\$20.00										
Cash Received	\$0.00	\$20.00	\$100.00	\$50.00	\$50.00	\$70.00	\$90.00	\$100.00	\$60.00	\$30.00	
Investment B	Period 01	Period 02	Period 03	Period 04	Period 05	Period 06	Period 07	Period 08	Period 09	Period 10	
Down Payment	\$100.00										
Cash Paid Out	\$10.00	\$3.00	\$10.00	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00	
Cash Received	\$30.00	\$20.00	\$20.00								
Investment A & B	Period 01	Period 02	Period 03	Period 04	Period 05	Period 06	Period 07	Period 08	Period 09	Period 10	
Down Payment	\$300.00										
Cash Paid Out	\$40.00	\$23.00	\$10.00	\$40.00	\$40.00	\$40.00	\$40.00	\$40.00	\$40.00	\$40.00	
Cash In	\$30.00	\$20.00	\$120.00	\$70.00	\$70.00	\$90.00	\$110.00	\$120.00	\$80.00	\$30.00	

Figure 3: Investment A and B cash flow schedules.

Return On Investment Section Investment A											
Initial Cash Outlay	\$200.00										
Run Of Cash Outflows	\$20.00	\$20.00	\$100.00	\$50.00	\$50.00	\$70.00	\$90.00	\$100.00	\$60.00	\$30.00	
Run Of Cash Inflows	\$0.00	\$20.00	\$100.00	\$50.00	\$50.00	\$70.00	\$90.00	\$100.00	\$60.00	\$30.00	
Net Cash Flow	(\$20.00)	(\$20.00)	\$100.00	\$50.00	\$50.00	\$70.00	\$90.00	\$100.00	\$60.00	\$30.00	
Cumulative Cash Flow	(\$20.00)	(\$40.00)	\$160.00	\$210.00	\$260.00	\$330.00	\$420.00	\$520.00	\$580.00	\$610.00	
Estimated Rate of Return (IRR)	20.0%										
Calculated Rate of Return (IRR)											17.9%

Figure 4: Investment A's return on investment as calculated by the IRR macro.

Return On Investment Section Investment B											
Initial Cash Outlay	\$100.00										
Run Of Cash Outflows	\$10.00	\$3.00	\$10.00	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00	
Run Of Cash Inflows	\$30.00	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00	
Net Cash Flow	(\$90.00)	\$17.00	\$10.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
Cumulative Cash Flow	(\$90.00)	(\$73.00)	(\$63.00)	(\$63.00)	(\$63.00)	(\$63.00)	(\$63.00)	(\$63.00)	(\$63.00)	(\$63.00)	
Estimated Rate of Return (IRR)	20.0%										
Calculated Rate of Return (IRR)											13.6%

Figure 5: Investment B's return on investment as calculated by the IRR macro.

Return On Investment Section Investment A & B											
Initial Cash Outlay	\$300.00										
Run Of Cash Outflows	\$40.00	\$23.00	\$10.00	\$40.00	\$40.00	\$40.00	\$40.00	\$40.00	\$40.00	\$40.00	
Run Of Cash Inflows	\$30.00	\$20.00	\$120.00	\$70.00	\$70.00	\$90.00	\$110.00	\$120.00	\$80.00	\$30.00	
Net Cash Flow	(\$20.00)	(\$23.00)	\$110.00	\$30.00	\$30.00	\$50.00	\$70.00	\$80.00	\$40.00	\$0.00	
Cumulative Cash Flow	(\$20.00)	(\$43.00)	\$67.00	\$97.00	\$127.00	\$177.00	\$247.00	\$327.00	\$367.00	\$367.00	
Estimated Rate of Return (IRR)	30.0%										
Calculated Rate of Return (IRR)											16.8%

Figure 6: Combined return on investment figures for Investments A and B as calculated by the IRR macro.

and \$20 at the end of the first and second years, respectively. You receive cash from the investment in years 3 through 10, \$100 in year 3, \$50 in years 4 and 5, \$70 in year 6, \$90 in year 7, \$100 in year 8, \$60 in year 9, and \$30 in year 10.

Investment B requires a down payment of \$100. Cash must also be paid in at the end of years 1 through 3 in the amounts of \$10, \$3, and \$10, respectively. You

receive a grand total of \$20 cash from this investment in all 10 years of the investment's life. A table describing both investments individually and collectively appears in Figure 3.

You can easily evaluate the investments by using the IRR macro. You enter the down payment and the cash inflows and outflows for each investment and for the two investments combined. The

reports illustrating the return on investment for Investment A, Investment B, and Investment A and B together are shown in Figures 4 through 6.

To produce these reports, first you retrieve the IRR subroutine model with the macro and description loaded in the area beginning with cell A2001. Use rows 1 through 99 as a "worksheet" area to create output from the macro and then use

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MACRO

You can analyze
any number of
investments using
the IRR macro.

1-2-3's MOVE command to move the results created in this worksheet to other parts of the spreadsheet. After the results are moved, assign a name to them using the RANGE NAME command. You use this name for printing the results of the analysis when called for.

Next, create cells for the investment cash inflows and outflows in some part of the spreadsheet other than the worksheet area. Note the amount of the down payment for each investment and the location of the rows containing cash inflows and outflows for each investment.

Finally, as you evaluate each investment using the IRR macro, enter this down payment and row location information. The results of each investment will be output in the worksheet area. As *1-2-3* produces the report for each investment alternative, move and name the report. The internal rate of return report can then be printed using the range name assigned to it.

As the results in Figures 4 through 6 show, you would reject Investment B and accept Investment A using the 15 percent return on investment criterion.

The third return on investment analysis, illustrated in Figure 6, shows that you can analyze any number of combined investments using the IRR macro. You do it by giving the combined cash inflows and outflows as input to the macro instead of individual cash flows for each investment. This IRR macro can be used repeatedly for any *1-2-3* spreadsheet that requires an internal rate of return calculation. The only information you need is the amount of the down payment, if any, and the starting location of the rows for cash outflows and cash inflows. ■

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GraffHopper also offers the more traditional approach to chart building through the use of a simple menu structure (including

on-line help) or command word method. Whatever the mode of chart creation, the objective of the software is the same: to produce complicated charts with as little user interaction as necessary.

GraffHopper also includes a unique feature — Chart Connect. Using

Chart Connect the user can access data already stored in LOTUS 1-2-3*, MULTIPLAN*, or dBASE II* files. With Chart Connect, spread sheet data may be retrieved through a series of simple user prompts and need not be rekeyed.

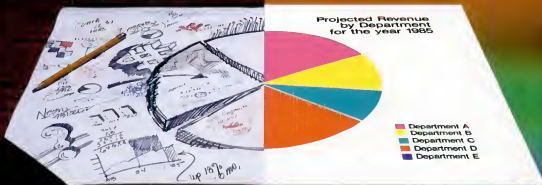
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A SPELLING CHECKER WITH A MIND OF ITS OWN

Born as an 8-bit program, MicroSpell has adapted beautifully to its new 16-bit home. In fact, its artificial intelligence features make it a superb spelling checker in any environment.

MICROSPELL

One of the pet peeves of PC owners is converted 8-bit software that doesn't take advantage of the 16-bit hardware's capabilities. CP/M

programs that ignore the extra memory space addressable by a 16-bit processor, don't write directly to the memory-mapped screen, don't use IBM graphics

characters, and don't use function keys are often annoying throwbacks to more primitive equipment. Occasionally, although not often, such software is so good in other ways that some of these weaknesses can be at least partially overlooked.

One of the best conversions to the PC is a new release of a venerable spelling checker, *MicroSpell* from Trigram Systems of Pittsburgh. *MicroSpell* was the best of the spelling checkers operating under 8-bit CP/M, and the PC version is actually vastly superior.

Unlike "brute force" spelling checkers that merely compare each word in a document against a stored list of correctly spelled words, *MicroSpell* uses artificial intelligence techniques to perform proof-reading magic. Its excellent user interface makes it easy to use, and it's fast as well.

Most spelling checkers scan a document, prepare a list of unique words, then sort this list and compare it to their dictionaries. *MicroSpell* moves through the document naturally, looking for misspellings as it goes. Because of this design, *MicroSpell* does not impose any restrictions on the size of the file that can be checked and how many unique words it can contain, nor does it waste time sorting a unique word list.

When it discovers a potential misspelling, *MicroSpell* automatically highlights the suspect word in its context in the document and displays the line number to help users with line-oriented editors. At the

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MicroSpell

Trigram Systems
3 Bayard Rd., #66
Pittsburgh, PA 15213
(412) 682-2192
List Price: \$139

Requires: 96K RAM, two disk drives or hard disk, compatible word processing program (runs with most word processors).

CIRCLE 796 ON READER SERVICE CARD

MICROSPELL

same time, *MicroSpell* makes up to three guesses on the correct spelling. The guessing routines are wonderfully accurate. The program bases its guesses on heuristics (general principles applicable in a large percentage of cases) rather than algorithms (exact rules), so it cannot *always* guess correctly, but it has a very high batting average. The heuristics tend to deal with dropped letters, doubled letters, and transpositions but don't include the "sound-alike" scheme featured in MicroPro's new *CorrectStar*. But we aren't likely to spell *ocean* as *oshan* anyway, and *MicroSpell*'s methods cover most normal typing and spelling errors.

From the Root

MicroSpell also can derive compound words through "suffix stripping," a process that involves building a word from its root by following heuristic rules for the construction of complex English words. Again, the heuristics are excellent but not infallible. However, the *MicroSpell* dictionary contains many complex words, making the suffix-stripping routines unnecessary in many cases. *MicroSpell* lets you know when a word it has suggested was generated by suffix stripping, so if the heuristics have failed and the word is incorrect, you can make a correction in other ways.

The program has a very flexible lookup function to scan through its dictionary. Wildcard characters are allowed (with some restrictions), so you can easily look up all words starting with *at* by asking for *ar** or words beginning with *re* with a *d* in the fourth position and ending in *ing* with *re?d*ing*.

MicroSpell also contains routines to look for double words like *the the*, which often occur when you move or delete text. The program can erase the second occurrence if you wish.

Unlike simpler spelling checkers that merely mark errors for later correction, *MicroSpell* normally makes the correction in the document. This feature is a tremendous timesaver because it eliminates the

need for a separate editing step. You can instruct the program to mark words in which the correction is of a different length than the misspelling so that you can

later reformat the paragraph containing the word if you're using justified margins.

MicroSpell's dictionary contains about 60,000 words that were selected based on

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CIRCLE 402 ON READER SERVICE CARD

MICROSPELL

/2 Start Pass #2	/3 Start Pass #3	/4 Start Pass #4
/A /R/C Wrds -> EXC File	/C Ignore UPPER CASE Wrds/D	Context Display Off
/E Turn EXception File Off	/F Mark If Size Changes	/I Auto-Insert Off
/L "Learn" Mode	/M Mark Suspect Words	/O Output File Off
/P Pause For Confirmation	/Q Turn Backup File Off	/R Ignore ".cmd's"
/S Suffixes to EXC File	/V INSERT After "V" Cmds	/W Double Word Chk Off

Current defaults are: (none)

Give switch(es) (e.g. /W/C), "H" for Help, "O" to cancel all defaults or "ENTER" to accept defaults

Figure 1: MicroSpell's option menu lets you customize the spelling checking process.

statistical studies of the most frequently used English words and enhanced by the addition of plural nouns, conjugate verb forms, superlatives, comparatives, and adverbial forms. The names of the countries of the world and many of their largest cities, all United States cities with populations over 100,000, many common abbreviations, most common English names, and computer terms were also added. The

suffix manipulation routines make the functional size of the dictionary even larger. You can also easily add to or remove from the main dictionary with a supplied utility or build supplemental dictionaries to use for all documents or for just one project like a thesis in which uncommon words will be used repeatedly. Words to be added or deleted can be taken from documents being proofed or built with a nor-

mal text editor or word processor.

The dictionary also contains "Auto-Correction" pairs, common misspellings along with their corrections. When *MicroSpell* comes across such a mistake it automatically makes the correction. You can add correction pairs to the dictionary if you commonly make the same entry errors or misspell the same words.

Spelling Time

Typing *SPELL* starts the program. If you don't specify a filename, *MicroSpell* will ask for one. The program also asks if it should use, in addition to the main dictionary, either an auxiliary dictionary named LEX.AUX or one with the same name as the file plus the extension .AUX.

MicroSpell then loads the main dictionary, which is provided on disk as four

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MICROSPELL

separate files, LEX.1 through LEX.4. The first contains words starting with *a-d*, the second *e-l*, and so on. *MicroSpell* will load as much of the dictionary as possible given the memory available on your system. A system with 256K or more RAM can hold the entire dictionary in memory. Since *MicroSpell* scans the source document only for words in memory, if the entire dictionary resides in memory the program will need only one pass through the document. A severely limited machine might require four passes. Because 8-bit CP/M systems *always* load only one segment of the dictionary, the 16-bit version is much smoother and faster on machines with adequate memory while remaining accessible to users with simpler systems.

The program creates a backup of the original source document by changing the first letter of the extension to *Q*. TEST.DOC thus becomes TEST.QOC. The corrected document is given the original filename. The program uses this process to avoid interfering with the normal .BAK backup files created by many word processors.

Many options let you determine exactly how *MicroSpell* will go about its business. You can specify the option "switches" at the end of the filename when you invoke *MicroSpell*, or you can set them from a menu that appears when you load the program (see Figure 1). For example, the /2, /3, and /4 options begin checking later in the alphabet, which is occasionally useful if an earlier checking run was interrupted. The option /C ignores uppercase words (useful to bypass abbreviations, acronyms, and instructions to the word processor); /R ignores words beginning with a period such as *WordStar* dot commands, and you can customize it to ignore any starting character, such as the at sign (@) that some word processors use to start commands.

Several of the switches allow you to modify normal program action. You can suppress context display with /D, disable the creation of the backup file with /Q (useful in systems with insufficient disk

space), or tell the program not to create the corrected output file if you simply want to see what *MicroSpell* would have done. A Help command, accessed with /H, dis-

plays the function of each switch.

An interesting option is /L for Learn mode in which *MicroSpell* scans the entire file but doesn't stop for corrections, but



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MICROSPELL

rather routes all words not in the dictionary to the Exception file. This option is useful for building a file of additional words to be included in the main dictionary or an aux-

iliary dictionary, but you should only use it if you know that all the words in the document are correct, either from a previous proofreading of the text or by check-

ing the Exception file itself.

If you customarily prefer a given set of option switches, you can create a short file containing only those switches and call it SWITCH.DEF. *MicroSpell* looks for this file and uses any switches it contains.

The switch system may seem complex, but the standard values are usually correct. Once you've responded to the "Add switches" query, the actual spelling checking begins.

Commanding Screens

MicroSpell divides the screen into logical areas that are easy to read and understand. You enter commands by hitting the first letter of the command name. If you prefer, you can enter several commands with function keys.

The correction process itself is very fast and intuitive. When the checking is complete, *MicroSpell* displays the number of words checked, suspect words found, corrections made, corrected words that changed size, if any, and words sent to the Exception file, if any. You can then specify another file to check, and *MicroSpell* will begin proofing immediately without reloading its dictionary.

MicroSpell's dictionary is stored in a special format that cannot be read or manipulated with normal text management tools. A utility appropriately called MAINT is provided to maintain the dictionary by adding or removing words. MAINT also can convert the dictionary to standard ASCII text, make empty LEX files if you want to build dictionaries from scratch, and display statistics about the words in the dictionary.

When compared with better-known spelling checkers, *MicroSpell* wins hands down in terms of speed, simplicity, ease of use, flexibility, and perhaps most importantly, accuracy. Trigram is a relatively small company, whose previous marketing of *MicroSpell* has not made the program a household word, but this spelling checker deserves better. Seek *MicroSpell* out and see it work. I bet you'll wind up buying it. ■

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Baggieware Blues

In the computer game business, size guarantees nothing. Guardian and Air Trax are both from tiny companies, but while the former is fun and simple to learn, the latter is dull and difficult.

It may be an endangered species, but it's reassuring to know that the Basement-Rec-Room Plastic-Baggie-Packaging Warbler (commonly known as Baggieware) is still alive somewhere in this country. PC Arcade has reviewed many excellent—and a number of mediocre—offerings from the multimillion-dollar software companies that have moved into the burgeoning IBM PC market in the past year; it's time for a report on games from tiny companies.

I have come to realize that game software from both large and small companies can be divided into three classes: Originals, which set a new tone and style; Dull Copies, which steal the tone while generally losing the style; and Clever Improvements, which are the result of a programmer looking at an Original and saying, "I can do that better."



Guardian

Simulations Software Co. (SIMCO)
P.O. Box 474
Nicholson, MS 39463
(601) 798-0865
List Price: \$9.99

Requires: 64K RAM, one disk drive, color/graphics adapter, game adapter, joystick.

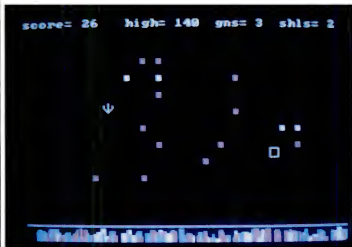
CIRCLE 760 ON READER SERVICE CARD

Guardian

Guardian, from W.O. Osterman and his Simulations Software Company, is a clever improvement on the hoary *Space Invaders* and *Defender* genre. Probably the most impressive thing about this simple offering is its lightning-quick response to the joystick. This game never made me feel that a sluggish program was cheating me out of points; the blame for any mistakes lay squarely on my re-

flexes. (It is, though, very important that you have a properly functioning joystick—I've found that our overused models have a lifetime of only a few months before they grow wobbly.)

Your goal is to defend a city against enemy drones that appear at the top of the screen and cruise lazily downward. You eliminate them by maneuvering your ship right into them (in an interesting touch, you have no guns or missiles of



Your box-shaped ship is busy defending the city in this screen from *Guardian*.

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PC ARCADE

your own). You must beware of the enemy missiles that zip horizontally across the screen. And, scattered among the various asteroids and other objects that clutter the sky are deadly mines that must also be avoided. Every once in a while, the descending drones retreat, forcing you into a one-on-one battle with a single missile. You zip around the screen gobbling up the asteroids and avoiding the mines while the missile chases you. The only way to destroy the missile is to lure it into colliding with one of the mines.

Maneuvering up and down and left and right is accomplished entirely with the joystick. Holding down the lower joystick button doubles the ship's speed, very useful for avoiding a missile.

Reflexes and Strategy

Displaying a trait common to all good computer games, *Guardian* calls upon the player to combine reflexes and strategy. I discovered that the best way to take out the descending drones was to approach them from the side rather than trying to catch them from below or above. To outfox the homing missiles, you've got to play coy and hide behind a rock. I very much like that the screens are randomly generated so you cannot just assume that the missiles will start in a particular place or get used to specific patterns of space mines. I also like the fact that you lose points for bad moves.

The game includes a very precise joystick adjustment routine, with optimization for two common joystick models from TG and Kraft. The game is playable on a monochrome monitor attached to the color/graphics adapter, although I suspect scores on a monochrome will be lower because of the greater difficulty of discerning space mines. The game maintains the high score—along with the name of the player who scored it—on the disk. The disk also holds a beginner's version of the game.

The instructions (called "documentation," which may give a hint of the author's background) are skimpy. One in-

teresting note: "Scoring 1,000 or more earns \$5 off the price of your next simulation from SIMCO."

Guardian is an ordinary concept, with ordinary graphics and the usual range of sound effects, but its play value is surprisingly high, principally because the joystick routines are so well done.

On *PC Magazine's* game rating scale from a low of 0 to a high of 6, *Guardian* gets a decent score:

FUN:	3.5
CHALLENGE:	3.5
SOUND/GRAPHICS:	2.5
TOTAL:	9.5



Air Trax

Control Concepts
P.O. Box 2367
Manassas, VA 22110
(800) 368-3078

List Price: \$44.95

Requires: 48K RAM, one disk drive.

CIRCLE 761 ON READER SERVICE CARD

I do a great deal of jetting around from place to place, and I'm not a nervous flyer. I've "flown" *Flight Simulator*, and I've even been at the controls of a "real" multimillion dollar flight simulator, if that isn't a contradiction in terms.

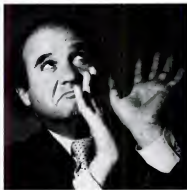
But after spending a few grueling hours with *Air Trax*, I'm not looking forward to my next airplane trip. If, as the author claims, this game is a true-to-life simulation of the screen display—and the job—facing an air traffic controller, it's not a sight calculated to instill confidence in the traveler.

Ads for *Air Trax* call it a "sophisticated, real-time simulation featuring professional user-friendly documentation, multiple runways, game hold, six game speeds, small craft, jumbo jets, supersonic transports, fuel constraints, and 25 airport/traffic pattern combinations (both fixed and random) ranging from simple to impossible." However, I don't want to accept that a particular air traffic pattern is impossible.

(continued)

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PC ARCADE

Perhaps the awkward turn-of-phrase, "user-friendly documentation," in the promotional material tipped me off. In any case, I immediately presented *Air Trax* with the award for this season's Nastiest User Interface. (That means it's a pain to learn and play.)

No Improvement

Devoted readers of this column may recall a review of a product from Avant-Garde Creations called *Air Traffic Controller*, which appeared about a year ago (see "Terminal Jet Lag," PC, Volume 2 Number 1). I excoriated the purveyors of that product for their total disdain for the quite reasonable graphics and sound capabilities of the IBM PC. I picked on them for their unnecessarily cryptic on-screen messages, such as 5<, 1150, E, which actually means that plane 5 is on a level course at 1,150 feet, heading east. I noted that their ASCII-character screen display was confusing and complained about the extremely sparse instruction set in the package. And I concluded that *Air Traffic Controller* was a half-baked adaptation of a game developed for earlier microcomputers.

Well, the developers of *Air Trax* took the ensuing year to come up with a Dull Copy that is even more confusing, makes no better use of the IBM PC's sound and graphics abilities, and possesses a detailed manual that requires the application of a strong light, a green eyeshade, an hour or so of silence, and fanatical determination before it will yield the information you need to get to the real tedium of playing.

What have the folks at Control Concepts done with their extra year of development time? Well, the aircraft status code on *Air Trax*'s minimal screen display reads something like BU4R2@8, obviously a huge improvement over *Air Traffic Controller*'s 5<, 1150, E.

This product seems to be a holdover from the days of severely limited memory, and the proof is in the product's requirements: only 48K RAM and no



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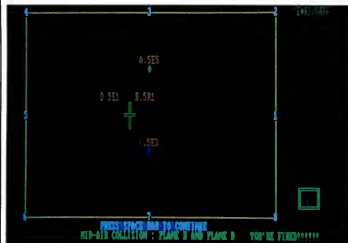
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PC ARCADE



A cryptic screen explaining that you have just lost your job as air traffic controller.

graphics adapter. *Air Trax* might have impressed an early owner of a TRS-80 Model II, but it pales when placed up against such products as *Flight Simulator* on the IBM PC.

I suppose that dedicated computer hackers and flying buffs might unearth some points of interest in *Air Trax*. For the rest of us, and probably even for enthusiasts, other simulation products are considerably more entertaining and friendly—and *Flight Simulator* is at the top of the list.

On *PC Magazine's* game rating scale, *Air Trax* is an Unrecommended Flying Object:

FUN: 1.0
CHALLENGE: 3.0
SOUND/GRAPHICS: 1.0
TOTAL: 5.0

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Computer Knowledge: New Perspectives

Readers are given a new perspective on old subjects in four books—one a history of the computer's early years, one a dictionary of terms, and two on programming.

During World War II, a team of engineers at the University of Pennsylvania's Moore School of Engineering, who were charged with the task of calculating ballistics tables, set out to create an electronic calculating machine that would be speedier and easier for them to use.

What these engineers built was ENIAC, which, depending on how strictly you define *computer*, was either the first digital computer or its immediate predecessor. It certainly was the first machine that resembled at all, in conception and construction, the kinds of electronic machines we use today.

Electrical engineer J. Presper Eckert, Jr., and physicist John W. Mauchly are the two men who claimed parentage of the computer with their invention, the UNI-

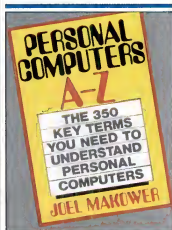
VAC. As Joel Shurkin shows in his book, *Engines of the Mind: A History of the Computer*, Mauchly and Eckert were not alone. Also present at the creation, but most often slighted by history, were their

precursor, John Vincent Atanasoff, named the "inventor" of the computer by a patent-case judge for his incomplete work prior to the war, doesn't deserve such credit for what was at best a near miss.

Shurkin has compiled a fascinating and detailed book about the prehistory and early years of computers (the book's subtitle, *A History of the Computer*, is needlessly and inaccurately broad). First tracing the histories of landmark figures Charles Babbage, Herman Hollerith, and Thomas Watson, Sr., Shurkin then explores the full development of the Moore School's Electronic Numerical Integrator and Computer and the later extrapolation of general principles from that special-purpose machine that led to the design of programmable, general-purpose computers. It is a stirring story and, although the book trails off when discussing the computer's transformation in the seventies and eighties, *Engines of the Mind: A History of the Computer* is unquestionably the definitive history of the computer's first 20 years.

Not on Good Terms

Both conceptually and practically, *Personal Computers A-Z* offers much that is admirable. Written in dictionary form supplemented by small essays, and concentrating on terms necessary for understand-



collaborators, Arthur Burks, Kite Sharpless, Robert Shaw, and Herman Goldstine. Joining them was John von Neumann, who, by virtue of his prodigious intellect and capacity to synthesize others' thinking, was quickly, and, according to Shurkin, unduly identified with the new electronic brain. Shurkin also feels their



Engines of the Mind: A History of the Computer

Joel Shurkin
W.W. Norton & Co., Inc.
500 Fifth Ave.
New York, NY 10110
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Cover Price: \$17.50
ISBN 0-393-01804-0

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BOOK REVIEW

ing computer use, the easily comprehended text is a browser's alternative to the many run-of-the-mill beginner's books. But if you prefer, as I do, accuracy

of information over accessibility, *Personal Computers A-Z* falls somewhat short. Here are some examples of the misinformation it peddles: 1,048 kilobytes make

up a megabyte (1,024K is, of course, correct); a byte can be 4 or 16 bits (word length may vary, but a byte is always 8 bits); a hertz is a measurement of electrical frequency between 2 million and 10 million cycles a second (1 million cycles a second is a megahertz); and the S-100 standard governs the internal workings of computers (for some microcomputers, yes, but none mentioned in this book).

This carelessness is manifested in other ways as well: occasional typographical errors, an index whose alphabetical order does not agree with that of the main entries, a misalphabetized entry, an error in the dating of "computer printers" to the precomputer era, the misspelling of both videotex and teletext, and the exclusion of Ada in the discussion of computer languages.

Actually, the poor discussion of languages is the book's only other major flaw. While the errors screech at you, they don't dominate the book. Scarcely any useful term is overlooked, and nary a useless one is included.

I also admire the author's inclusion of the Billboard Information Network—the "information service for the pop-music industry." And at times he can be entertaining (see the excerpt at the end of the review). Still, whatever its merits, unreliability makes me unable to recommend this reference work.

(continued)



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Personal Computers A-Z: The 350 Key Terms You Need to Understand Personal Computers

Joel Makower
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BOOK REVIEW

Excerpt: Stand-alone. People who fail to use the right toothpaste or deodorant, or who make themselves unsociable by speaking in computer jargon.

Getting the Best of BASIC

Carl Shipman's tutorials in BASIC, tailored to the IBM PC, have as much right to the title of "best books on BASIC" as any

other on the subject. In a word, they are unsurpassed. With their frequent examples, and comprehensible instruction, these two books for the beginning and advanced programmer are thorough and sensible. Every question that inexperience leads one to pose is anticipated, even down to the highlighted information for the beginner on how to save a program from the book that's been keyed in but not fully explored. Unfortunately, not every BASIC word is defined and BASIC's advanced graphics, color, and music capabilities are not discussed (These are reserved for a separate volume in the series, *IBM PC Graphics and Color*.) Otherwise, these books go far to ensure fruitful learning sessions: For example, whenever a program example is shown on two pages, a note at the page bottom tells you the program is continued on the next page, reminding you not to omit the last lines. That's the kind of prompting you need from a teacher. Shipman deserves a lot of credit, which the designer, Leslie Sinclair, should certainly share. ■



How to Program Your IBM PC: BASIC for Beginners

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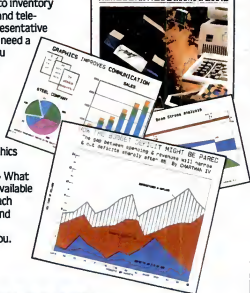
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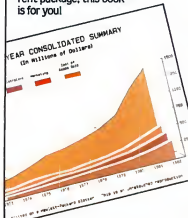
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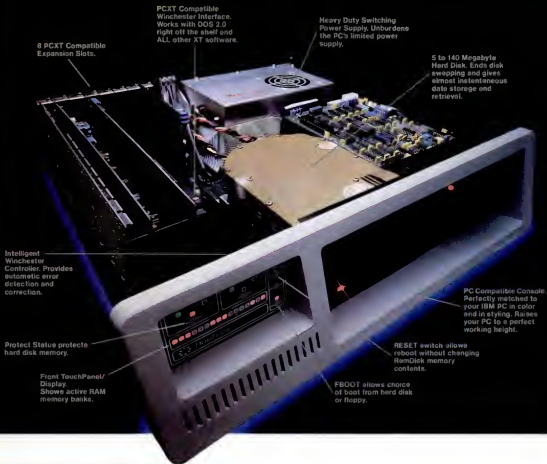
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PCs Clear a New Scheduling Path

Inexpensive and efficient scheduling techniques that can be run on the PC are explored in this second part of a report on the revolutionizing benefits of critical path scheduling.

A minirevolution is brewing among users of critical path scheduling, and the PC is playing an active role.

Critical path scheduling, as I discussed in my last column (see "On a Critical Path," *PC*, Volume 3 Number 19), is a method for organizing a sequence of construction activities.

Computerized critical path techniques were once the privilege of large construction companies or scheduling consultants with access to mini- or mainframe computers. But the capabilities of the PC and other personal computers have prompted software developers to design numerous microcomputer scheduling programs.

The differences between microcomputer scheduling programs and minicomputer/mainframe systems go far beyond cost and power considerations. The PC's 16-bit capability, monochrome graphics, and color capabilities are not only converting many big-system users to micro scheduling but are also transforming a large number of contractors into critical path scheduling users and believers.

Micro-scheduling programs allow the user to build a schedule through interaction with the program, with some error checking to prevent duplicate entries and discontinuity. There are no cryptic code sheets to fill out, and less time is lost trying to process networks containing faulty



logic or data entry errors. The interactive use and speed allow the user to play "what-if" games to produce and evaluate alternatives quickly and effectively. This is perhaps the most significant advantage that a microcomputer scheduling system offers.

While the actual calculation of the network may be slower than on a mini- or mainframe computer, the overall turnaround time is often much quicker on the PC. There's no need to go through a data processing center, service bureau, or consultant and then wait for the information to come back. On a micro, schedules are easier to produce and update, and contractors will find that using critical

path schedules optimizes their work schedules and helps them keep ahead on items that require lead time.

Costs are fixed, which allows substantial savings over service bureaus or other methods. Once contractors purchase the computer and program, they may use the equipment for as many projects as needed without spending more money. And software for the PC costs far less than comparable software for mini- or mainframe computers.

Major Disadvantage

The major disadvantage of microcomputer scheduling programs is the relatively limited number of activities that can be handled. Most micro systems can handle from 200 to 2,500 activities; minicomputers can easily handle several thousand activities, which is often required to manage large complex projects.

A smaller problem is the difficulty in finding PC scheduling programs that include *resource leveling capability*. This is the process of rescheduling activities and/or reallocating resources in order to optimize available resources or to meet schedule deadlines. Some sophisticated minicomputer scheduling systems provide this capability, and it has recently begun appearing on several PC scheduling programs as well.

(continued)

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Important Features

Many good scheduling programs ranging in price from \$150 to \$2,500 are available for the IBM PC. Here are some questions to ask yourself when evaluating a scheduling program.

Does the program have solid software

When evaluating
programs, ask
yourself, How many
activities does
the program allow
per project?

principles incorporated into its overall design? How many activities does the program allow per project? (Determine how many activities you expect to have in your own networks, and don't forget dummy activities.) How many resources, if any, will the program let you assign to each activity? Does the number of activities depend upon the amount of internal computer memory? If so, how much memory will you have to add to handle the number of activities you need? Is a hard disk necessary for larger networks?

Most importantly, how will the speed of entering and editing data, sorting, calculating networks, and producing reports be affected by large networks? Ask for the exact times to expect, given your computer configuration and the typical size of your projects.

Is the scheduling system based on the critical path method (activity-on-arrow) or the precedence (PERT or program evaluation and review technique) method? When you test out a program, enter a short schedule of 10 to 20 activities that spans over a year in duration. Manually run out the same calculations and compare the results. This not only verifies that the program works, but it helps you understand how the program treats holi-

days, weekends, and different work weeks.

Can scheduling activities be entered randomly or must they be entered in sequential order? Does the user have flexibility in choosing number schemes? (Many schedulers like to identify their activities in increments of 10 or 50, which allows for inserting additional activities between already existing activities.) Ascertain that the maximum activity number is not governed by the maximum number of activities. Will the program let you renumber the existing activities to make room for new ones?

Can actual completion dates of activities be entered? Can activities be easily added or deleted? For example, some programs that are excellent for planning and reporting actual progress become cumbersome to use when you try to add or delete activities.

Calendar Questions

Does the program's calendar take holidays into account, and can they be changed by the user? Can multiple calendars be maintained and a master calendar accessed by all jobs? Is the unit of time upon which the calendar is based fixed at five 8-hour workdays per week, or can workdays be varied to reflect, for example, 9- or 10-hour days? Can you have multiple shifts? Can the number of workdays in a workweek be changed?

Most programs use the workday as the basic unit of time, but some contractors may occasionally need to schedule a project on a different basis. You should ask if you can use hours, weeks, or months in place of days.

Reports and Graphics

Are the supplied reports easy to read and understand? Can selections be made for running separate reports for field use? Supervisors and foremen in the field may not understand network diagrams or critical path method terminology, and they may not want to flip through a large printout. If the computer can print one-

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or two-page reports, or perhaps a bar chart reflecting the weekly schedule, then reports will be much more intelligible to the foreman.

Are there sorting or report-writing capabilities? What utilities are there for sending data to a spreadsheet or database manager for further manipulation?

What kind of charts or diagrams can be produced? Are they easy to read and use? Will the program drive a plotter? Can network diagrams or better yet, time-scaled network diagrams be produced?

On-screen graphics can be useful tools for contractors. Does the program support the high-resolution graphics capabilities of the PC to produce on-screen diagrams or other aids to network construction and analysis? Does it take advantage of color?

What resources can be carried with each activity? Does the program produce resource reports or diagrams, such as histograms or manpower curves?

Does the program satisfy the contract requirements for the project on which it will be used?

Can networks be "cloned"? A contractor that performs the same type of work all the time will want to clone his basic construction schedule. Also, a sub-

A subnetworking or supernetworking capability may be desirable.

networking or supernetworking capability may be desirable for large projects.

Can data be exchanged with popular word processing, database management, or spreadsheet programs?

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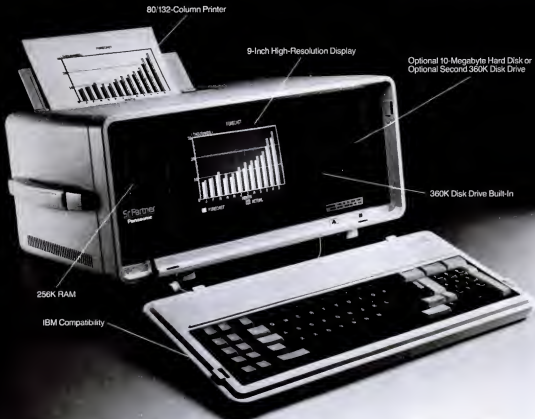
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Figure 1: The Travel 'Scan master menu has 14 features.

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Other savings include frequent traveler bonuses, corporate rates at hotels, and specials for the system's Last Minute Discount Club. You can become a member for an additional fee of \$25 per year. Members receive weekly electronic updates on travel discounts of 10 to 50 percent. Last-minute discounts on ocean cruises, tours, and other travel services can also yield substantial savings.

The Compute-A-Trip option offers comparison shopping for cost-conscious managers on virtually all the services and accommodations of a given city, combining information from all Travel 'Scan databases and adding Special Deals.

An added savings bonus for purchases made through the system is free connect time. For example, if a business books \$5,000 in travel and services, that same business would be credited with \$150 in free connect time.

Travel 'Scan also expects to offer a special business travel account module that will draw together services tailored to business customers. Currently, electronic billing procedures facilitate centralized control over company travel expenditures. Free terminals are available to volume users.

(continued)

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CIRCLE 156 ON READER SERVICE CARD

BUSINESS

On-line Help

As with many new systems, not all of Travel 'Scan's features are fully operational, but you can call a 24-hour toll-

free number if something does not function as expected. Help is also available in the form of good documentation. The Travel 'Scan loose-leaf manual offers

clear instructions and examples. It repeats some information in different sections, which adds to its length but limits the need to flip through the manual in search of menus and commands. An index would have been a useful addition, but the detailed table of contents serves as an acceptable substitute. Travel 'Scan also provides a small pamphlet of command summaries, which is adequate for most needs.

The system encourages efficiency by letting users enter multiple commands on a single line. Therefore, advanced users can save time and reduce on-line charges by bypassing unneeded menus and prompts.

Travel 'Scan can be accessed with virtually any microcomputer or terminal, at both 300 and 1200 baud (1200-baud users pay no surcharge). Travel 'Scan Videotex's *Flashcom*, customized software that simplifies system access and use, is available at a reduced cost or even for free because of rebates given for purchases made through Travel 'Scan.

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Subscribers pay a one-time fee of \$50 per individual or \$100 per corporate account. A monthly fee of \$2 is charged for each traveler profile stored with an account. Connection fees of \$15.50 (nights and weekends) and \$19.50 (weekdays) are levied, but rebates to volume users can reduce that amount. Subscribers pay a surcharge when accessing *OAG EE's* fares and schedules.

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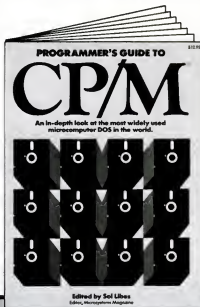
PROGRAMMER'S GUIDE TO CP/M

Edited by Sol Libes

Here's an important collection of CP/M insights that you'll never find in any CP/M manual. CP/M is the most popular microcomputer DOS in use today, and this widespread use has generated many innovative techniques and enhancements of CP/M. *Programmer's Guide to CP/M* tells you what these enhancements are and how to put them to use, how to get around apparent limitations of a CP/M system and why CP/M is far more versatile than you might have imagined. Every article in *Programmer's Guide to CP/M* originally appeared in MICROSYSTEMS between

January 1980 and February 1982. Except for this collection, these articles are now unavailable! *Programmer's Guide to CP/M* gives you an in-depth look at CP/M from the viewpoint of the programmer—the individual who creates the software that interfaces directly with CP/M, or who is installing CP/M on systems for which configurations do not already exist.

Contents include "An Introduction to CP/M," "The CP/M Connection," "CP/M Software Reviews," "CP/M Utilities & Enhancement," "CP/M 86" and "CP/M Software Directories." 200 pages, \$12.95.



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Computers Teach The Teachers

California's Teacher Education and Computer Centers coordinate teacher training and software evaluation while encouraging a closer relationship between education and industry.

Most of the energy and money flowing into computer-aided instruction is aimed at children. But computers can't be completely effective teaching tools unless teachers learn to use them as well. With this in mind, the California school system, the first in the country to address the issue on a state-wide basis, has established a network of 15 Teacher Education and Computer (TEC) Centers throughout the state. And the program's progress is being watched carefully by educators and businesspeople alike.

Why business? Dr. Jack Hill, director of the TEC Center serving San Diego and Imperial Counties, points out that leaders of both the public and private sectors realize that the future of our nation's security and economic viability rests on the kids we train today.

"Two years of math isn't enough to operate present or future technical equipment," says Hill. "It's the students with math skills who will fill the high-tech, high-priority jobs. With student enrollments declining, we have to funnel more training into those remaining, and we have to do it more efficiently. Computers are essential to that approach."

Teacher Shortage

"The challenges are many, varied, and deep," explains Hill. "There is a



growing dearth of math, science, and language teachers. Predictions are that by 1992 California alone will be short some 150,000 to 180,000 teachers—approximately half of today's teaching force."

The shortage is compounded by the imminent retirement of large numbers of teachers. The average age for teachers in San Francisco, for example, is 52. In San Diego it's 46. As these teachers retire, tight budgets will prevent hiring new teachers. Instead, teachers from other types of classes are plunged into subjects for which they are not well trained.

Teacher training is the highest priority on the TEC Centers' agenda. The idea is

to train trainers, and that cost is recovered under special funding for developing a computer teaching staff.

The San Diego TEC Center's physical plant is typical of the centers. Two rooms hold a variety of computer systems, at least one of every unit that might be available in the area's schools. There's an IBM PC, a PCjr, a Commodore, a Kaypro, an Acorn, and even a robot on loan for use in teaching Logo.

The TEC Centers address three kinds of problems. First, they retrain and update present math, science, and language teachers. "Many good teachers can't keep up with the rapidly changing knowledge," says Hill.

Crossover Teachers

The Centers also work with "crossover" teachers brought in from other subject areas to teach unfamiliar disciplines. These teachers often have little foundation in their new subject—and some don't really care.

"The third problem is the most frightening," says Hill. "The problem is how to attract and keep teachers with an average starting salary of \$13,500. A good science or math teacher can easily make \$23,000 to \$25,000 at the entry level in the business world."

Solutions to these problems—more help and funding from both the computer

EDUCATION

community and the business world—are pending in various amounts and quantities. Implementation is the bottleneck.

The Center's second priority is to help create a state-wide resource for software evaluation. Individual review copies, requested from the publishers by the network's San Mateo headquarters, are sent to each center. There, the appropriate specialists test the software. If merited, it's introduced into a class for student review. Evaluations are made according to a list of established requirements.

The San Mateo office compiles the software reports from each of the 15 centers and circulates them back to all the centers. A constantly updated reference notebook lists programs by subject, name, publisher, and compatible system. Ratings cover grade level, ease of use, general design, reactions of students

to the software, documentation, and overall opinion. When a teacher decides to use a program, classroom copies are

The centers serve as "brain linkers" between schools and business.

ordered. No software from the TEC Centers is copied or circulated.

The centers also serve as a "broker" and "brain linker" between schools and business, says Hill. "One of our first steps was to involve leaders of 40 large companies with our policy making board. Industry has a considerable stake in educating future workers, and these

executives have been anxious, even eager, to help."

Hill's own enthusiasm is obvious. "So far we've assisted in several 'school adoptions,'" he boasts. For example, a Hewlett-Packard facility provided systems for a local high school. It also provided a staff person to help train the teachers and is available when a question arises. Hewlett-Packard knows it will be able to hire some of these people, and others are following that lead.

The U.S. Navy, a dominant employer in San Diego, has cooperated magnificently. Twenty-five civil and shore commands have "adopted" schools. (Students use word processors to communicate with a ship's crew.)

Last summer the Navy offered 14 high-powered teacher-training positions for math and science teachers. The teach-

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EDUCATION

ers worked with engineers at the Navy Ocean Systems Center. By the time the teachers completed the program, their awareness and enthusiasm ran so high they were like different people. The program is an ego booster, too. Some teachers believe they can only teach, but these situations show them that teaching has given them effective skills in planning, organization, and presentation.

This combination of skills is very salable, putting teachers in a position to be spirited away by higher salaries. In fact, over 80 percent of the teachers who have gone through the education technology centers at San Diego State University have not returned to teaching.

This problem is causing school systems in several states to abandon traditional tenure policies. Rather than permanently hiring teachers and guaranteeing salary raises based on seniority, these systems treat teachers like private-sector employees and award sal-

dealing with stress, conflict, and change. So far, computers can't teach these essentials."

The problems, strategies, and success-

es of California's TEC Centers provide a springboard and testing lab for educators and concerned policy makers in every segment of society. ■

**"The teacher is
the software
between computer
and student."**

ary increases and responsibility based on proven ability. The philosophy that the education system should be run as a business reaches to operating budgets, too, and promotes establishing them well in advance, rather than annually.

This kind of radical change is necessary because, while computers can aid in teaching by providing motivation, reinforcement, and instant feedback, "the teacher is the software between computer and student," according to Hill. "Students working only with computers can fall into the 'lonely learner syndrome.' Computers can import information and logical thought, but students must also be made sensitive to human conditions, to the needs of others, and to techniques for



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With SUMIT running my business, our executive office has become rather informal. This month we're in Papeete—next month Pago Pago.

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CIRCLE 492 ON READER SERVICE CARD

Video Medicine

The combination of computer-aided instruction and interactive video makes it possible to design medical training programs that simulate human behavior for marketers and psychiatrists.

Computer use in medical training—especially psychiatric training—suffers from a profound shortcoming: it's very difficult for computers to portray the idiosyncrasies of human behavior. The addition of video, however, makes it possible for computer training to more closely mimic human interaction.

Dr. Marc Schwartz, formerly of Yale University Hospital, first became aware of the educational opportunities offered by the interaction between computers and video in 1980, at which time he was teaching clinical psychiatric residents there. "No training can compete with seeing the real thing," Schwartz admits, but his experience designing IBM PC-driven training programs has convinced him that video comes very close. Schwartz conceived a computer/video combination that would simulate clinical encounters so young doctors could try different approaches and witness the results, without involving real patients and real risks.

Schwartz developed his own interface, called the Cavri Connection, to connect the IBM PC, through its RS-232 port, with a selection of videocassette and videodisk machines. The PC drives the VCR or videodisk machine as it would any storage device, but it plays back real images and sounds instead of



computer graphics and text.

Unfortunately, Schwartz found that obtaining funds to support his product's development was more difficult than creating the product itself. At that time, most medical schools did not have the money, interest, or appropriate hardware to back experimental development efforts of this type.

Commercial Applications

But Schwartz did find an existing market in the medical world that was ready to exploit computer/video's potential. Drug companies welcomed Schwartz's ideas about computer/video training and were eager to apply them to pharmaceutical

sales training. The drug companies had big enough budgets and big enough needs to justify experimenting with Schwartz's training devices. For Schwartz, delving into the subtleties of the encounter between doctor and drug rep provided an opportunity to explore human behavior.

His first client, Pfizer Inc., assigned him the task of educating salesmen about how doctors think, what issues are important to them, and how they select or buy pharmaceuticals. Pfizer is incorporating Schwartz's method into the sales campaign for its new antiarthritis medication, Feldene, but Schwartz says the seven modules he developed could easily

MEDICINE

spot. They must respond verbally, on camera, to the concerns they hear the doctor express on screen. The instruction session ends with the rep viewing the videotape of his or her own performance.

Psychiatric Training

Schwartz's commercial success has allowed him to return to the problem that originally sparked his computer/video efforts: psychiatric resident training.

As editor and publisher of *Computers in Psychiatry/Psychology*, a quarterly newsletter, Schwartz has seen the IBM PC make deep inroads into the field of mental health and rapidly become the de

Schwartz predicts that many physicians who equip their practices with IBM PCs for office management applications and medical database access will soon

begin adding videodisk machines as peripherals. He is convinced that the possibilities of computer/video applications in medical training are limitless. ■

Schwartz's PC oriented training programs portray a variety of clinical encounters.

facto standard for both industry and academia. He believes that the incorporation of videocassette recorders and videodisk machines is the next logical step.

His PC-oriented psychiatric training programs use videocassettes portraying a variety of patient conditions and clinical encounters. Schwartz combined standard behavioral patterns from training films with computer text questionnaires to simulate doctor/patient interviews.

He explains: "We determine when to interrupt the tape and ask the students questions. With computer interaction you can build skills and diagnostic abilities in a standardized manner."

This project still relies on the relatively slow videotape medium (as opposed to quick, random-access videodisks), which has limited interactive capabilities. Schwartz explains that most of his projects start on videotape to facilitate the extensive editing that is usually necessary. "The videodisk is for the finished product," he says.



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The GRAYSCALER

An adapter for the IBM color/graphics board, converting the board to true gray-scale operation. The GRAYSCALER provides 16 distinct brightness levels of composite video. Since the adapter is driven from the RGB port of the color/graphics board, any green, white, or amber monitor can be used in place of more expensive RGB displays for displaying graphics and text. (List Price: \$59.95)
Avocado Computer
 17352 Yorkshire Ave.
 P.O. Box 632
 Yorba Linda, CA 92686
 (714) 528-1025

CIRCLE 757 ON READER SERVICE CARD

Maxwell Modems

Internally mounted and standalone modems featuring 0-to-300 or 300-to-1,200 bps transmission rates and a proprietary technique for reducing the noise over common phone lines. The desktop models connect directly to the user's system via the RS-232 port; the board models are sized to fit the IBM PC's internal expansion slots (including the slots in the IBM Portable PC).

Designated Maxwell 300V or 1200V for the standalone models, and

300PC or 1200PC for the internally mounted boards, the modems feature manual handset or keyboard-controlled dialing, eliminating the need for a telephone on the line. Automatic features include full call-progress detection, informing the user if a line is busy, ringing, answered, or unanswered; unattended dialing, with tone or pulse signal detection and selection; and auto-answer and call disconnect based on previously established default parameters. In addition, the 1,200 bps models feature a coherent detection method that allows it

to be used over phone lines unusable by other types of modems, and full diagnostic capabilities.

The internally mounted models also feature two dialing protocols with automatic detection for compatibility with the manufacturer's and with the Hayes software protocols. The units automatically switch to the proper protocol based upon the response received from the party called. Dialing options offered by the boards include keyboard or handset dialing and unattended operation. The units automatically determine if tone

or pulse dialing is required.

Included communications software supporting the line of modems enables the user to display such reports as the numbers dialed, how many times a number has been dialed, and the number of calls completed. Telephone numbers and the time of day they should be called can be pre-established for automatic dialing.

(List Price: 300 bps, \$350; 1,200 bps, \$595)

Racal-Vadic
 1525 McCarthy Blvd.
 Milpitas, CA 95035
 (408) 946-2227

CIRCLE 758 ON READER SERVICE CARD



Maxwell Modems, Racal-Vadic

DigiSound-16

A device allowing the user to digitize and reconstruct high-fidelity audio. The DigiSound-16 is capable of full 16-bit audio digitizing and playback, with 8-bit and 12-bit formats also programmable for less stringent audio requirements.

The device is connected to the user's system via two parallel ports. The sampling rate can be as high as 100 kHz in mono, or 50 kHz in stereo, and it is programmable by the user. Low-pass filters are plug-in modules that allow any mix of sample rates to be used in any installation.

A built-in, first-in-first-out buffer of 32K RAM

HARDWARE

eliminates the need for buffering in the host computer and allows continuous with-disk operation in systems without DMA controllers. The buffer's status is shown on a front-panel bar graph display. (List Price: \$2,995)
Micro Technology Unltd.
2806 Hillsborough St.
Raleigh, NC 27607

CIRCLE 768 ON READER SERVICE CARD

IRMAcom

A terminal emulator board offering the user a choice of terminals through different software programs available with the board. Depending upon the program chosen, the board can operate in any of the following modes:

- IRMAcom/3270, providing SNA 3274 controller emulation;
- IRMAcom/3270B,



IRMAcom, Digital Communications Associates, Inc.

providing BSC 3274 controller emulation;

- IRMAcom/3770, providing SNA 3770 Remote Job Entry station emulation;

• IRMAcom/3770B, providing BSC RJE station emulation.

(List Price: Board and one program, \$895; additional programs, \$495 each)
Digital Communications

Associates, Inc.
303 Technology Park
Norcross, GA 30092
(404) 448-1400

CIRCLE 767 ON READER SERVICE CARD

Model 70 PC Cartridge Tape Drive

A 1/4-inch cartridge tape system providing 16.5 megabytes of data storage capacity per cartridge. The unit transfers data at 0.7 megabytes per minute, permitting the user to completely back up a 10-MB hard disk in about 15 minutes. Data are stored in a file-oriented architecture, which allows only those files that have been changed since the last backup to be updated.

The Model 70 PC includes a Z-80-based drive-controller board that fits a slot in the IBM PC, as well as driver software. (List Price: \$1,780)
Digi-Data Corp.

8580 Dorsey Run Rd.
Jessup, MD 20794
(301) 498-0200
TWX: 710-867-9254

CIRCLE 762 ON READER SERVICE CARD

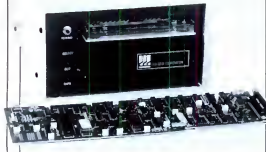
Parallel 2 to 1 (S) PC Switch

An A-B switch permitting the user to link two peripherals to a single computer, or two computers to a single peripheral. Both the output and common connectors are the 36-pin cinch type (female); 32 of the 36 pins are switched by the device (those pins used by the Centronics parallel communications standard).

The switch includes connecting cables.

(List Price: \$245)
Switch & Mux, Inc.
10 Oakridge Ave.
Merrimack, NH 03054
(603) 424-4161

CIRCLE 765 ON READER SERVICE CARD



Model 70 PC Cartridge Tape Drive, Digi-Data Corp.

Do-It-Yourself Monitor

A 12-inch diagonal monochrome monitor available in kit form for hobbyists. The HVM-122A Kit features an amber phosphor CRT that accepts an NTSC composite video signal. It also features a switch for displaying either 40-character or 80-character screen formats.

The monitor is designed with a completely modular chassis to facilitate construction. Front panel controls include power, black level, contrast, horizontal and vertical hold, and vertical height. An LED indicator shows when power is on.

Available options include a tilt base that allows the monitor to be positioned for comfortable viewing.

(List Price: Kit, \$89.95)
Heath Co.

Dept. 349-195

Benton Harbor, MI 49022
(616) 982-3210

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Drive Two Enhancement Package

An expansion kit for the IBM PCjr providing a second 360K floppy disk drive, a parallel port, a clock/calendar with battery backup, and an expansion slot that enables the PCjr's RAM to be increased up to a total of 512K. With the Drive Two add-ons, the PCjr can run any software written for the

IBM PC.

(List Price: \$675)

Rapport Corp.

80 S. Redwood Rd., #213

N. Salt Lake, UT 84054

(801) 292-9454

CIRCLE 767 ON READER
SERVICE CARD

PC CAD/Graphics System

A two- and three-dimensional interactive graphics workstation built around the IBM PC. The PC CAD/Graphics System package includes a PC or PC-XT, 2-D and/or 3-D digitizer tablets, an RGB monitor, color pen plotter, matrix printer

(up to 400 cps), a communications interface, and a color/graphics adapter board.

An extensive list of available options for the system include the 8087 math coprocessor, high-resolution color CRT (with resolutions up to 1,024 × 1,024), image camera and digitizer (with digitizing at up to 200 points per inch), a text/document reader, a network interface, and a laser printer.

The system's integrated graphics software provides menu-driven macro commands for all functions, including image creation and

editing, manipulations and dimensioning, coloring and highlighting, and printing or plotting. Additional communications software options are available for transmission of graphics data between networked graphics workstations and to remote IBM or DEC host computers and central CAD installations.

(List Price: Basic configuration, \$4,900)

Computer Systems

26401 Harper Ave.

St. Clair Shores, MI 48081

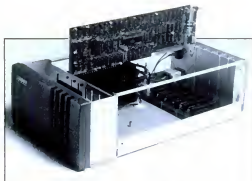
(313) 779-8700

CIRCLE 768 ON READER
SERVICE CARD



Drive Two Enhancement Package, Rapport Corp.

HARDWARE



PC Expansion Box, DataWare Development, Inc.

PC Expansion Box

An expansion chassis permitting up to six IBM PC function boards to be added to the user's system. Incorporating its own 65-watt power supply, the PC Expansion Box Model 24600 can accommodate a range of add-on boards, such as additional memory, hard disk or tape drive controllers, data acquisition, or networking.

The expansion chassis also features an integral fan to cool the system boards. (List Price: basic model, \$309)

DataWare
Development, Inc.
4204 Sorrento Valley Blvd.
San Diego, CA 92121
(619) 453-7660
TWX: 910-335-2066

CIRCLE 769 ON READER
SERVICE CARD

Handi I Plus

A multifunction board with up to 384K RAM, a parallel I/O port, a serial port, a clock/calendar, and an op-

tional game port. The board includes a 6-foot peripheral cable, and a software package containing HANDISPOOLER, HANDIDISK, clock/calendar settings, and memory diagnostics.

The board is offered in any increment of 64K RAM, and additional RAM can be added as needed. The parallel port provides standard IBM parallel printer compatibility. (List Price: 64K RAM, \$395)

APSTEK, Inc.
2636 Walnut Hill
Ln., #335
Dallas, TX 75229
(214) 357-5288

CIRCLE 764 ON READER
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RS-232 to RS-422 Adapter

An adapter allowing an RS-232 device, such as a personal computer, to communicate reliably on an RS-422 communications link at distances of up to

4,000 feet. A panel-mounted toggle switch allows the user to configure the lines for communications devices or terminals.

With the adapter, the user can access up to 10 RS-422 devices on a multidropped RS-422 serial line.

(List Price: \$255)
Struthers-Dunn, Inc.
Systems Division
4140 Urica Ridge Rd.
P.O. Box 1327
Bettendorf, IA 52722
(319) 359-7501

CIRCLE 766 ON READER
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IEEE-488 General Interface

A GPIB I/O board with built-in 12K ROM Command Interpreter to handle the board's required initialization and protocol functions. The Model IE-488 board's Command Interpreter can be linked to all high-level languages, and

it can be accessed directly from PC-DOS. The Interpreter also implements all 12 of the IEEE-488 interface messages and controller states C1 through C5. One command-line CALL statement contains the command plus device numbers and protocol for data transfer for up to 14 devices simultaneously.

Up to two of the boards can be inserted into the same IBM PC, permitting the system to operate as two independent IEEE-488 systems.

(List Price: \$395)
MetraByte Corp.
254 Tosca Dr.
Stoughton, MA 02072
(617) 344-1990

CIRCLE 763 ON READER
SERVICE CARD

E-Z-READER

A bar-code reader capable of scanning and accepting data from a wide range of bar labels printed with a



RS-232 to RS-422 Adapter, Struthers-Dunn, Inc.

variety of methods, including dot matrix printers. The device reads, decodes, and transmits Code 3-of-9, Interleaved 2-of-5, Codabar, and UPC labels; it connects to the user's system via an RS-232 port.

The reader features two user-controllable LED status indicators and low-frequency tone, multiple self-tests, and a Hewlett-Packard wand with a replaceable tip. It signals "audible" to indicate a correct bar-code reading and offers switch-selectable terminator character(s), which the E-Z-READER adds after reading bar code to signal the host computer to go on to the next programmed action.

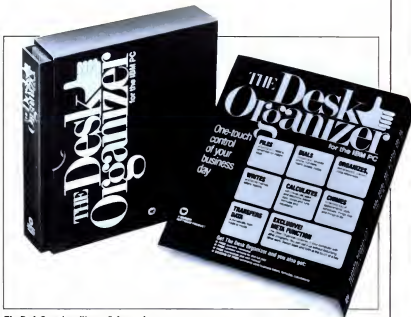
(List price: \$495; operating manual alone, \$20)
Peripheral Connections
 2190 W. 11th St.
 Eugene, OR 97402
 (503) 344-1189

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SOFTWARE

The Desk Organizer

An executive desk management program integrating an alarm clock, a four-function calculator, an automatic phone dialer, an appointments calendar, and a cardfile-type database manager. An exclusive META function allows the



The Desk Organizer, Warner Software, Inc.

program to operate concurrently in RAM with other applications software, which permits the user to access its features from the other application with a single keystroke.

The Desk Organizer's card file DBMS allows several hundred free-form notes to be stored per file, with up to 20 indices for each file. The built-in text editor allows up to 2,500 characters of text per note, displayed in the lower 12 lines of the screen. Features of the text editor include Wordwrap, Overwrite or Insert modes, cursor keypad support, and Block Copy/Delete facilities.

Using input from either a clock/calendar card installed in the user's system or the initial date and time entry at boot-up, the software's alarm clock feature provides a continuous time display on screen; up to 100 simultaneous alarm settings; and three types of alarm signals: chime, visual display, or automatic recall of a specific note. The alarms activate despite the mode or application program the user is working in at any particular moment.

The calendar function of *The Desk Organizer* displays months through the ninety-ninth century, using Zeller's Congruence. Appointments are monitored

and tracked in conjunction with the alarm clock function.

The Desk Organizer can be run in the background of other applications. The user switches back and forth via single keystroke toggles, with the cursor returning automatically to its location in both programs. Also provided are data transfer facilities between programs.

(List Price: \$295)
Requires: 128K RAM, two disk drives, PC-DOS.
Warner Software, Inc.
 666 Fifth Ave.
 New York, NY 10103
 (212) 484-3070

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PC Magazine Oct. 18, PC World Nov. Submitted Aug. 18, 1984

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Requires: 128K RAM, two 320K drives, PC-DOS. Analox Computing, Inc. 5222 Richmond Rd. Bedford Hgts., OH 44146 (216) 464-5013

CIRCLE 772 ON READER SERVICE CARD

QINT/SQL

A database management system that is designed to be compatible with the SQL/DS and Database 2 systems developed by IBM for its mainframe systems. This compatibility permits the user to integrate PC-based data files with corporate centralized databases.

Query Manufacturing P&L for first quarter

LAST Qtr	Jan	Feb	Mar	Quarter	YTD
11 Sales	12,779.4	15,422.2	12,546.3	40,728	100.00%
12 Cost of Goods	3,219.9	3,353.8	3,386.6	9,959	25.00%
13 Gross Profit	9,559.5	12,068.4	9,159.7	30,778	75.00%
14 Rent	1,000.0	1,200.0	1,200.0	3,500	8.75%
15 Salaries	3,200.5	4,750.0	3,905.4	11,975	29.75%
16 Utilities	664.0	678.6	700.0	2,042	5.00%
17 Supplies	1,862.4	1,873.8	1,803.7	5,539	13.80%
18 Travel	26.4	266.2	278.9	571	1.40%
19 Communications	75.0	884.7	812.0	2,471	6.00%
20 Misc. Expenses	523.4	938.9	940.2	2,402	6.00%
21 Total Expenses	7,954.7	9,765.4	9,181.1	26,901	66.25%
22 Net Profit	2,004.8	2,303.0	1,978.6	6,286	15.75%
23	0.0	0.0	0.0	0.0	0.00%
24	0.0	0.0	0.0	0.0	0.00%
25	0.0	0.0	0.0	0.0	0.00%

Extract cost of goods from sales - gross profit for Jan to Mar
 Extract sales - total expenses - gross profit for Jan to Mar

INTUIT, Nounemon Corp.

QINT/SQL employs a tiered approach permitting corporate EDP managers to control sensitive database administration data while allowing the PC user to access needed data files. Three versions of the DBMS are available: *Query*, for users whose need is simply to retrieve data from the mainframe files; *Query + Update*, for users who will enter as well as retrieve data; and *Administrator*, for the EDP officer charged with the creation, maintenance, and management of in-house database systems.

The separation into distinct elements helps ensure that mainframe database structures and data files are modified only by authorized users. To further increase security, a unique "signature chip" is required to run *QINT/SQL*. This chip is supplied with each package.

QINT/SQL uses Structured Query Language

(SQL), an English-like query language used by the mainframe DBMS software, to retrieve data in the form of tables, with columns and rows. SQL is designed to require less programming than other programming languages (such as BASIC or COBOL) and is fully interactive. An unlimited number of tables can be joined, and each user can have a personalized view of the tables.

(List Price: \$1,000-\$9,000, depending upon version)

Requires: 640K RAM, one disk drive, PC-DOS.

QINT Database Systems Corp.
 50 Waban Hill Rd. No.
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 (617) 527-9329

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INTUIT

An integrated software package combining word processing, spreadsheet, da-

tabase, directory, file management, and four-function calculator. Also included are a universal forms and report generator with a mailmerge facility. Optional modules to become available include business graphics, communications, and time management.

INTUIT uses plain English commands, with file names of up to 67 characters permitted. Using the ten functions, users can transfer data back and forth between the software's various components. The directory component, which integrates the system, can be nested up to 50 levels deep.

Word processing functions include word wrap; search and replace; block moves, copy, sort, and delete; horizontal and vertical scrolling; automatic pagination; chapter, section paragraph, subparagraph, and list formatting; as well as underlining, boldface, and super/subscripts. Database management functions include direct data entry from other components of the system or through screen input forms.

(List Price: \$395)

Requires: 256K RAM, one disk drive.

Nounemon Corp.
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(List Price: \$695)

Requires: 128K RAM, 10-MB hard disk.

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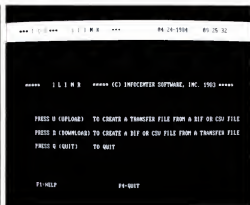
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CIRCLE 785 ON READER
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iLINK

A dictionary-driven program for transferring data to and from IBM mainframe systems. The software is compatible with all IBM PC software for data manage-



iLINK, InfoCenter Software

ment, graphics, and financial analysis applications using DIF or CSV file formats.

The procedures for transfer are English language-prompted, and on-line help screens are available at any point in the software's use. The software's dictionary allows the user to tailor interchange files to a specific software package into which the data are to be transferred.

iLINK downloads data from the mainframe by transforming the files into DIF or CSV formats that can be read by the PC. It uploads by transforming those formats into easily accessible mainframe exchange files that can be read by any software running under the VM/CMS operating system.

The program also cross-

loads data between different mainframe database management products and between different PC applications programs. To ensure security, *iLINK* does not bypass any normally available security system features.

Features of the software include an electronic note pad, partial source file extraction, record ID creation, field name and width modification, row/column transposition for each transfer procedure, and automatic default options. The complete software package contains mainframe magnetic tapes for two database links (choice of *SAS*, *FOCUS*, *RAMIS*, *ADRS2*, *APLDI*, or *FPS*); ten PC disks, documentation, and tutorials. Additional mainframe database links and PC diskettes are available.

(List Price: complete sys-

tem, \$12,500; additional links, \$1,000; additional PC disks in units of 10, \$4,000)

Requires: IBM PC: 128K RAM, one disk drive, PC-DOS; Mainframe: IBM 370, 43xx, or 30xx systems.

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(List Price: \$99.95)

Requires: 64K RAM, one disk drive, PC-DOS.

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No. 1 Home Tutor

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No. 1 Home Tutor details the operation of such components as the keyboard and disk drives and explains their interaction with multicolor graphics. DOS commands such as DISKCOPY and FORMAT are taught through interactive sessions.

(List Price: \$59.95)
Requires: 64K RAM, one disk drive, PC-DOS 2.1.
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 San Jose, CA 95131
 (408) 943-0596

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A utility for *dBASE II* users that allows data file sorts up to 33 times faster than is possible under the Ashton-Tate program alone. *dFASTEST* can sort up to 32 fields or parts of fields at once, and it also provides a means to rescue "bad" data files, copy files to another diskette, and pack *dBASE II* data files rapidly. The utility's Sort function can sort files in non-ASCII order (so that "apple" appears be-

fore "ASCII," for example), a feature normally found only in *dBASE II*'s INDEX function.

The Rescue feature can find overlapping records, extra End-of-File markers (such as those placed by an accidental loss of power to a system while a data file is open), and false record counts, and it can repair corrupt file headers and recover data files deleted after a MODIFY STRUCTURE command.

The software can be called directly from within *dBASE II* and can be incorporated into command

files to enhance applications developed using *dBASE II*.

(List Price: \$89.95)

Requires: 128K RAM, two disk drives, PC-DOS, *dBASE II*.
 Software Research Technologies
 3757 Wilshire Blvd., #211
 Los Angeles, CA 90010
 (213) 384-5430

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CorpSec/MGR

A program for documenting corporate stockholder, board of directors, and executive com-

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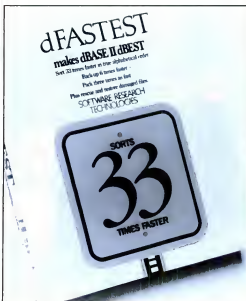
(List Price: \$425)

Requires: 128K RAM, two disk drives, PC-DOS, *Peachtext 5000*.
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 Richardson, TX 75081
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dFASTEST, Software Research Technologies

constraints in a project plan that affect development expectations. Confidence levels and risk factors are calculated to provide the user with data needed to make decisions on cost, schedule, effort, manloading, and cash flow.

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2. Releases should be typewritten double-spaced on one side of the paper. Copies of advertisements for the product may be included, but in most instances we need more information about a product than is typically included in an ad.
3. Include telephone contacts for marketing and technical questions.
4. If available, include black-and-white glossy photos of the product, 4 x 5 in. or larger.

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CIRCLE 166 ON READER SERVICE CARD

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Designing DOS Filters

New PC-DOS features such as redirection of I/O make it simple to design your own ready-to-use filters with BASIC.

The most useful utility programs are not necessarily the most complex or powerful. A simple utility can be very handy if it saves a few minutes a day, or if it lets you perform a needed function with a minimum of effort. PC-DOS versions 2.0 and higher provide three programs in the form of filters MORE, FIND, and SORT, that make it easy to manipulate data files and to pass information between programs. Only a few filters are provided with PC-DOS, but new features, such as enhanced batch file processing and the redirection of I/O, make it a snap for you to design your own filter programs for various uses.

In this article, we present two "home-made" filters. One filter guarantees that all carriage returns in a file are paired with linefeeds, while the other ensures that a file has an end-of-file marker. These filters are elegantly simple—thanks to the power of PC-DOS 2.0—and run with the speed of assembly language. Besides being fine examples of the application of some new features of DOS, these filters are fully functional and ready to use.

Redirection and Filters

PC-DOS 2.0 lets the user send input to a program from any file, just as if that input had been typed at the keyboard. This is known as redirection of the standard input. The standard input defaults to read-



ing from the keyboard, but a less-than sign (<) on the command line is all that's required to redirect the standard input away from the keyboard. For example, the command line

```
LINK <LINKFILE.DAT
```

runs the LINK program, taking the instructions for the linker from the file LINKFILE.DAT.

The standard output from any program—that is, the interactive output that normally goes to the screen—can likewise be redirected to any file by using a greater-than sign (>). For instance, the command line

```
TREE > SUBDIR.LST
```

sends the list of all the subdirectories on

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PROGRAMMING

```

100 REM BASIC program to create filter program CR/LF.COM,
110 REM which makes sure that all carriage returns in the
120 REM filtered file are paired with a linefeed. An
130 REM end of file marker (Ctrl-Z) is added if missing.
140 DIM TEMP%(100)
150 I=0: SUI=0
160 READ EKSUM
170 READ TEMP%(1)
180 IF TEMP%(1)=1 THEN 220
190 SUM=SUM+TEMP%(1)
200 I=I+1
210 GOTO 170
220 IF CKBUM=SUM THEN 250
230 PRINT "*** INCORRECT DATA - CHECK AND REENTER ***"
240 END
250 OPEN "O":1,"CR/LF.COM"
260 FOR J=0 TO I-1
270 PRINT #1,LEFT$(TEMP%(J),1);
280 NEXT J
290 CLOSE
300 END
310 DATA 7653
320 DATA #HEB, #H02, #H00, #H0A, #H1A, #HEB, #H21, #H00
330 DATA #HBA, #H02, #H01, #HEB, #H3D, #H00, #H80, #H2E
340 DATA #H02, #H01, #H0D, #H74, #H02, #HEB, #HEE, #HBA
350 DATA #H03, #H01, #HEB, #H2E, #H00, #HEB, #H09, #H00
360 DATA #H80, #H3E, #H02, #H01, #H0A, #H75, #HE1, #HEB
370 DATA #HDC, #H2B, #HDD, #H89, #H01, #H00, #HBA, #H02
380 DATA #H01, #H84, #H3F, #HCD, #H21, #H22, #HCO, #H74
390 DATA #H01, #HCS, #H80, #H3E, #H02, #H01, #H1A, #H74
400 DATA #H0A, #HBA, #H04, #H01, #HEB, #H04, #H84, #HBA
410 DATA #H4C, #HCD, #H21, #H89, #H01, #H00, #H8E, #HCB
420 DATA #H24, #H40, #HCD, #H21, #HCS
430 DATA -1
    
```

Figure 1: A BASIC program that creates the filter program CR/LF.COM. To create the filter, you start BASIC with the command BASICA, enter the program exactly as shown, and run it by typing RUN. When you exit BASIC with the SYSTEM command, CR/LF.COM will be on the default disk and will be ready to run.

the default disk to the file SUB-DIR.LST.

For both input and output, the default standard device is the console device, CON: On input, the console is the keyboard, and on output, it is the video display.

A new feature introduced with DOS 2.0 is the filter. A filter is a program that accepts information from the standard input, modifies that data in some way, and then sends the transformed information on to the standard output. For example, the FIND filter, provided with DOS, accepts input from any text file and passes on to the standard output only those lines of text that contain the string of characters you specify. This allows you to pick out certain lines of interest. Either one or both of

a filter's input and output may be redirected away from the console to any file.

You can visualize a filter as sitting between the standard input and standard output; it modifies the information passed from the input to the output according to a unique set of rules. As an example, you should look at one that filters all bare carriage returns into carriage return/linefeed (CR/LF) pairs.

Creating a CR/LF Filter

Many users have been frustrated trying to use a file with only a bare carriage return marking the end of each line, rather than the CR/LF pair that most PC-DOS programs require. This problem is particularly common when working with files

PROGRAMMING

transferred from other computers via a modem or direct connection. For example, files transferred from an Apple II typically contain no linefeeds and cannot be properly listed or used with most IBM software without being modified. In fact, both EDLIN and WordStar treat such a file as if it consisted of one long line.

In the past, programs to fix files that contained bare carriage returns could be written in BASIC, but these were agonizingly slow. Alternatively, such programs could be written in assembly language, but it was no small undertaking. The redirection features and new functions provided by PC-DOS 2.0 make it simple to design a compact, easy-to-use filter program that changes all bare carriage returns to CR/LF pairs with the speed of assembly language. The great advantage of filters is that they make it easy to massage information as it passes between programs and to perform a whole series of file manipulations with a single command line.

The BASIC program, shown in Figure 1, creates the filter program CRLF.COM. Just start BASIC with the command

BASIC

enter the BASIC program exactly as shown and type

RUN

to create the filter. When you return to DOS with the SYSTEM command, the file CRLF.COM will be present on the default disk and will be ready to be used. The filter is extremely compact, only 86 bytes.

If you receive the message

*** INCORRECT DATA -
CHECK AND CORRECT ***

you have mistyped one or more of the values in the DATA statements. Therefore, you must use the LIST command to print out the program, find the typos, correct them, and run the program again.

Using the CR/LF Filter

To use the CR/LF filter, you redirect the input from the file with bare carriage returns and redirect the output to the file in which you want to store the corrected text. If you do not redirect the output, the corrected text is displayed on the screen. We strongly suggest that you don't filter a file back onto itself because this action simply

destroys the original file.

For example, if you try to type file BARECR.TXT, which has a program listing with each line terminated with a bare carriage return, then each line will overwrite the previous line because there are no linefeeds to advance the cursor to the next row of the screen. This is easily set right with the command line

CRLF <BARECR.TXT

When executed, this command reads all the characters from the file BARECR.TXT, changes all bare carriage returns to carriage return/linefeed pairs, and sends the corrected text to the screen, which is the default standard output. Because all carriage returns have been paired with linefeeds, the text will display legibly on separate lines.

Similarly, the command line

CRLF <BARECR.TXT >
CRLFPAIR.TXT

takes input from the file BARECR.TXT, passes it through the CR/LF filter to correct all bare carriage returns, and sends the corrected text on to the file CRLFPAIR.TXT. You can then use the

A>DEBUG

```
-F 100 L1C "LINE 1" 0D "LINE 2" 0D "LINE 3" 0D "LINE 4" 0D
-D100 11B
6BF8:0100 6C 49 6E 65 20 31 0D 6C-49 6E 65 20 32 0D 6C 49 LINE 1.LINE 2.LI
6BF8:0110 6E 65 20 33 0D 6C 49 6E-65 20 34 0D NE 3.LINE 4.
-RCX
CX 0000
:IC
-RBX
BX 0000
:J
-N TESTCRLF.DAT
-W
Writing 001C bytes
-Q
A>
```

Figure 2: Creating TESTCRLF.DAT with DEBUG. Each line ends with a carriage return but no linefeed. Enter the underlined text as shown; if any response differs from that shown (other than the segment address 6BF8), exit with the "Q" command and start over.

PROGRAMMING

file CRLFPAIR.TXT as you would any normal DOS file.

That's really all there is to using the CR/LF filter. A single command line, with redirection of the standard input and output, ensures that every carriage return in any file is properly paired with a linefeed. CR/LF works well with the piping features of DOS 2.0 as well.

One nice feature of the CR/LF filter is that any carriage return that is properly paired with a linefeed is left alone. You can filter either a normal file or one that has both bare and paired carriage returns, and no harm will be done to the carriage returns already paired. However, some programs that set high bits may make linefeeds unrecognizable to CR/LF. Files created by such programs should first be passed through another filter to strip the high bits. Alternatively, you could modify CR/LF to ignore high bits.

The CR/LF Filter in Action

Let's create a small file with only bare carriage returns so that we can see why the CR/LF filter is needed and how it works. You use the DEBUG program as shown in Figure 2. When you are finished, you will have the file TESTCRLF.DAT on the default disk, containing four lines of text—each terminated with a bare carriage return. To verify that there are no linefeeds in this file, enter the command line

```
TYPE TESTCRLF.DAT
```

You will see that text lines display one atop the other, so only the last line is visible. If you edit this file, you may find it does not display properly; EDLIN, for example, does not treat the lines as separate.

Now enter the command line

```
CR/LF <TESTCRLF.DAT
```

to pass this file through the CR/LF filter and send it to the screen. The file will display correctly because a linefeed is inserted at the end of each line.

To create a corrected version of the file TESTCRLF.DAT, you should enter the

```
100 REM BASIC program to create filter program MARKEOF.COM
110 REM which makes sure that the filtered file has an
120 REM end of file marker (Ctrl-Z)
130 DIM TEMP%(100)
140 I=0: SUM=0
150 READ CKSUM
160 READ TEMP%(1)
170 IF TEMP%(1)=-1 THEN 210
180 SUM=SUM+TEMP%(1)
190 I=I+1
200 GOTO 160
210 IF CKSUM=SUM THEN 240
220 PRINT "*** INCORRECT DATA - CHECK AND REENTER ***"
230 END
240 OPEN "O": "MARKEOF.COM"
250 FOR J=0 TO I-1
260 PRINT #1, LEFT$(HEX$(TEMP%(J)),1);
270 NEXT J
280 CLOSE
290 END
300 DATA 5443
310 DATA 6HEB, 6H02, 6H1A, 6H2B, 6HDB, 6HB9, 6H01
320 DATA 6H00, 6HBA, 6H02, 6H01, 6HB4, 6H3F, 6HCD, 6H21
330 DATA 6H23, 6HCD, 6H74, 6H0E, 6HBB, 6H01, 6H00, 6HBB
340 DATA 6HCB, 6HBA, 6H02, 6H01, 6HB4, 6H40, 6HCD, 6H21
350 DATA 6HEB, 6HE2, 6H60, 6H3E, 6H02, 6H01, 6H1A, 6H74
360 DATA 6H0C, 6HBB, 6H01, 6H00, 6HBB, 6HCB, 6HBA, 6H03
370 DATA 6H01, 6HB4, 6H40, 6HCD, 6H21, 6HB4, 6H4C, 6HCD
380 DATA 6H21
390 DATA -1
```

Figure 3: A BASIC program that creates the filter program MARKEOF.COM. To create the filter, you start BASIC with the command BASICA, enter the program exactly as shown, and run it by typing RUN. When you exit BASIC with the system command, MARKEOF.COM will be on the default disk and will be ready to run.

command line

```
CR/LF <TESTCRLF.DAT
>CORRECTED.DAT
```

The filtered output, with all carriage returns properly paired with linefeeds, is stored in the file CORRECTED.DAT. You can edit or display this file as you would any normal text file.

The procedure is just as simple for any file of any size. Just redirect the input from the file that contains bare carriage returns and redirect the output to the file in which you want the corrected text to be placed.

Marking the End of the File

A handy feature of the CR/LF filter is that it inserts an end-of-file (EOF) marker at the end of any file that lacks one. Ctrl-Z (value 26, or hexadecimal 1A) is generally used to mark the end of text files. Most

text editors and word processors look for this EOF marker when they load a file, but EDLIN is an exception to this rule. However, not all files contain an end-of-file marker; for instance, files created with the COPY CON: command and those created with the DEBUG program lack the EOF marker. If the marker is not present, most programs assume that all of the last sector of information read from the disk is a valid part of the file, but it is not.

If the character Ctrl-Z (hexadecimal 1A) is not the last byte of any file filtered with CR/LF, then a Ctrl-Z is added to the end of that file so that it can be edited properly. For example, put a disk with space for a file in the default drive and enter the command lines

```
COPY CON: NOEOF.DAT
THIS FILE IS NOT
TERMINATED WITH AN EOF MARKER
```


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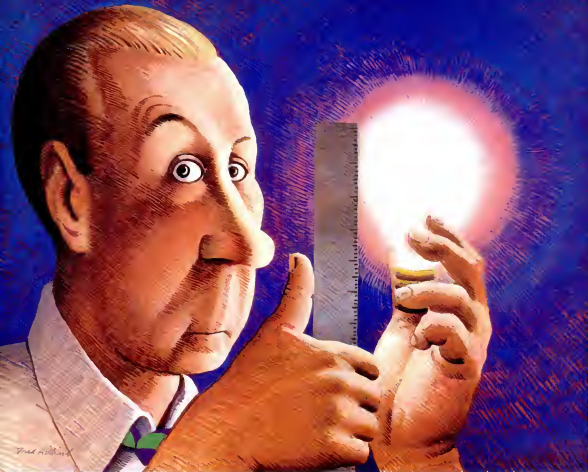
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EDITED BY PAUL SOMERSON

User-to-User

PC readers help one another through this forum by passing along their questions, solutions, comments, and complaints.

Oops

PC tests program listings extensively to make sure they work, then lists them directly to a printer to avoid transcription errors. Nonetheless, despite the usual pre-



cautions, gremlins crept into a recent *User-to-User* (Volume 3, Number 16) and changed two greater than signs (>) into asterisks (*).

To make the "TREE is Tops" cross-directory-backup-file-craser work the way it is supposed to, you'll have to make two small changes. In the **KILLBAK.BAT** batch file, change the 11th line up from the bottom of the listing to **TREE>BAK-DEL.FIL** and change line 160 of the **BAK-CLEAN.BAS** file to **160 IF LEFT\$(AS,5)<>CHR\$(10)+''Path'' THEN 180**

BASIC Translator

A "translate" function for BASIC would be useful in a number of ways. The **DEF FNXLATE\$** statement in line 120 of the **XLATOR.BAS** program in Figure 1 is just such a function.

At first glance, the function may look very complicated—almost impossible to interpret—but it's actually pretty straightforward. It performs a "lookup" and "translate" operation intrinsic to most high-level languages, but, unfortunately, lacking in BASIC.

XLATOR.BAS includes several examples of what such a translate and lookup function can do, such as changing lowercase characters to uppercase, spelling out single digits, and converting decimals to fractions and month numbers to month names. (For the syntax of and rules for using this function see Figure 2.)

Note that you must place an arbitrary character between each source-list entry if the length of each entry exceeds one character. This ensures that a false match will not occur somewhere between source entries. This explains the extra spaces between the decimals and between the month numbers.

If you try to enter a value that is not in the lookup table, **FNXLATE\$** will make a false match on the first entry of the source list. To get around this **INSTR** quirk, simply include a character such as a backslash

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USER-TO-USER

```

100 ' XLATOR -- by Walt Muncaster -- Adapted by PC
110 KEY OFF:CLS
120 DEF FNXLATE$(S$,T$,A$,S,T)=MID$(T$,((ABS((T=1)*(ABS((S=1)*(INSTR(S$,A$)))+AB
S((S<>1)*((INSTR(S$,A$))\S)+1))))+ABS((T>1)*((ABS((S=1)*(INSTR(S$,A$)))+ABS
(S<>1)*((INSTR(S$,A$))\S)+1))-1)*T+1))*ABS(INSTR(S$,A$)>0)*(ABS(INSTR(S$,A$
)=0)*255),T)
130 INPUT "Enter a lower case letter: ",LOWER.CHAR$
140 UPPER.CHAR$=FNXLATE$("abcdefghijklmnopqrstuvwxyz","ABCDEFGHIJKLMNOPQRSTUVWXYZ
XYZ",LOWER.CHAR$,1,1)
150 IF UPPER.CHAR$="" OR UPPER.CHAR$="" THEN 130
160 PRINT "The upper case version of ";LOWER.CHAR$;" is ";UPPER.CHAR$:PRINT
170 INPUT "Enter an integer from 0-9: ",N$
180 N$=FNXLATE$("1234567890","\\ONE TWO THREEFOUR FIVE SIX SEVENEIGHTNINE
ZERO ",N$,1,5)
190 IF N$="" OR N$="" THEN 170
200 PRINT N$; " spelled out is ";N$:PRINT
210 INPUT "Enter a multiple of .125 that is less than 1.0: ",DECIMAL.ENTEREDE$
220 IF LEN(DECIMAL.ENTEREDE$)<4 THEN 210
230 FRACTIONS=FNXLATE$("\\125 .250 .375 .500 .625 .750 .875","\\1/81/43/81/
25/63/47/8",DECIMAL.ENTEREDE$,3,3)
240 IF FRACTIONS="" OR FRACTIONS="" THEN 210
250 PRINT "The equivalent fraction to ";DECIMAL.ENTEREDE$;" is ";FRACTIONS:PRINT
260 INPUT "Enter a date in MO/DY/YR format (start MO with 0 if <10): ",DATE$
270 MONTH.NAMES$="\\01 02 03 04 05 06 07 08 09 10 11 12"
280 MONTH.NAMES$="\\January February March April May June
July August SeptemberOctober November December "
290 MONTH.NAMES$=FNXLATE$(MONTH.NAMES$,MONTH.NAMES$,LEFT$(DATE$,2),3,9)
300 IF MONTH.NAMES$="" OR MONTH.NAMES$="" THEN 260
310 PRINT DATE$ " is in ";MONTH.NAMES$

```

Figure 1: This XLATOR.BAS program uses DEF FN statements to perform the lookup and translation function in BASIC.

(\) as the first entry in the source and target lists as shown in the XLATOR program.

If you type in this program, be sure to put the lengthy FNXLATE\$ function in line 120 all on one line.

Walt Muncaster
Deatsville, Alabama

There are simpler ways to do some of the translations suggested. For instance, the DEF FN statements in the SWITCH.BAS program in Figure 3 can turn uppercase characters into lowercase ones, change lowercase characters into uppercase ones, or switch letters of either state into the other. However, for long lists involving such things as fractions and spelled-out months, XLATOR is very handy. You just have to be careful to add trailing spaces so INSTR strings such as JULYxxxxx, APRILxxxxx, and SEPTEMBER all come out the same length. And you

have to trap for erroneous inputs. If you take away the trap added in line 220 of Figure 1, for instance, an entry of .3 will yield 3/8.

Preventing Print-Screen Hangs

The PRTSCR.COM program created by PRTSCR.BAS in Figure 4 is designed to turn off the screen-copy function. Normally, when no printer is attached and no print spooler is in use, hitting Shift and the Prtscr key hangs the system. With the standard IBM key layout, Shift-Prtscr is all too easy to hit, so most of the time I

leave the screen copy off. You can do this by typing PRTSCR while in DOS. To turn it back on, just type PRTSCR Y. The function takes up one segment (256 bytes) when resident—the minimum DOS allows.

Lt. Scott E. Garfinkle
U.S. Army
APO, New York, New York

The accidental Shift-Prtscr can indeed be annoying, and this seems to solve the problem. IBM ought to have made it possible to toggle features like this (and the

```

X$=FNXLATE$(S$,T$,A$,S,L), where
S$ is the source list of entries to be scanned.
T$ is the target list that contains the entry to be returned.
A$ is the argument to be used to test for a match in the source list.
S is the length of each entry in S$ ( 0 < S < 255 ).
L is the length of each entry in T$ ( 0 < L < 255 ).

```

Figure 2: The syntax and rules for the lookup and translation function of XLATOR.BAS.

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USER-TO-USER

parity-error crash and the initial boot-up memory test in a CONFIG.SYS-type file so you could turn them on or off depending on your needs.

Mr. PC Fixit

Here are two problems I have had with my IBM PC—along with solutions for them.

Problem One. After running for about 3 hours, my computer would go into wonderland. The screen would show the same symptom you get when you turn the power switch off (a big vertical glitch followed by a blank screen). The fan would keep

running, but the computer would lock up and nothing would reset the system except to turn the power off, wait a minute or so, and then start again. After about an hour, the same problem would occur.

My system has five expansion slots. Four slots are filled with monochrome color/graphics, disk controller, and STB super io boards. The color/graphics and super io boards are large boards that allow very little clearance between the chassis and motherboard. They were originally in slots 3 and 4. I moved them to slots 1 and 2 where there is more room (and fewer chips on the motherboard), and the problem has

```
100 ' SWITCH.BAS -- by PC Magazine
110 KEY OFF:CLS
120 PRINT "FNLC turns lower case letters into upper case."
130 PRINT "FNUC turns upper case letters into lower case."
140 PRINT "FNSC switches upper to lower and lower to upper."
150 PRINT:PRINT "Now enter upper and lower case letters:"
160 PRINT TAB(6); "Or -- Hit ESC to quit";PRINT
170 DEF FNLC(X)=CNR((ASC(X) AND 95))
180 DEF FNLC(X)=CNR((ASC(X) OR 32))
190 DEF FNSC(X)=CNR((ASC(X) XOR 32))
200 A$=INPUT$(1):IF A$=CNR(27) THEN END ELSE PRINT A$;
210 PRINT " with FNLC yields ";FNLC(A$);
220 PRINT " with FNLC yields ";FNLC(A$);
230 PRINT " with FNSC yields ";FNSC(A$):GOTO 200
```

Figure 3: This SWITCH.BAS program uses DEF FN statements to juggle uppercase and lowercase letters.

Figure 1: BASIC progess to create PRTRSCR.COM file that can disable / enable the IBM Shift-PrTrScr screen-dump-to-printer function.

```
100 ' PRTRSCR.BAS -- creates .COM file to toggle SHIFT-PRTRSCR off/on
110 ' .COM progess by Lt. Scott E. Gerfinkle
120 ' In DOS, typing: PRTRSCR disables SHIFT-PRTRSCR;
130 ' In OOS, typing: PRTRSCR Y enables SHIFT-PRTRSCR;
140 OPEN "PRTRSCR.COM" FOR OUTPUT AS #1
150 FOR A=1 TO 116
160 READ A$:B$=VAL("Ch"+A$)
170 NEXT
180 IF B=10698 THEN RESTORE:GOTO 200
190 PRINT "Recheck your DATA statements":END
200 FOR A=1 TO 116
210 READ A$:A$="Ch"+A$
220 PRINT #1,CNR(VAL(A$));
230 NEXT
240 PRINT "PRTRSCR.COM CREATED"
250 DATA 8B,17,00,00,00,00,50,72,74,73,00,2E,80,3E,64,00
260 DATA 00,75,01,CF,2E,FF,2E,5C,00,8C,8C,8E,06,A0,82,00
270 DATA 3C,59,74,04,3C,79,75,05,C6,06,0A,01,FF,FC,33,C0
280 DATA 8E,C0,26,C4,3E,14,00,8B,D7,63,EF,C5,8D,36,C6,01
290 DATA A7,75,06,A7,75,03,A4,C0,20,89,16,02,01,8C,06,04
300 DATA 01,33,C0,8E,C0,26,C7,06,14,00,63,00,26,8C,0E,16
310 DATA 00,C0,8C,8E,C0,8E,02,01,8F,C0,80,89,17,00,F3,A4
320 DATA 8B,D7,CD,27
```

Figure 4: Here is a BASIC program to create a PRTRSCR.COM file that can disable / enable the IBM Shift-PrTrScr screen-dump-to-printer function.



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USER-TO-USER

never recurred.

My guess is that I have a heat-sensitive chip on my motherboard and that the problem might just be delayed rather than solved. But as long as the computer works, I am satisfied.

If you suspect you have a heat problem, put your big boards in the left expansion slots of your PC. This move will improve the air flow. A hair dryer can be used to direct heat to certain components to find which one is causing the problem. But a word of caution: any chip will fail or give erratic results if it gets much hotter than its design temperature.

Problem Two. One Saturday evening, the spacebar on my keyboard quit working. Under the spacebar is a long wire spring that runs its entire length. This spring came loose, which caused my spacebar to become inoperative. An inoperative spacebar essentially puts the keyboard out of commission, which puts the computer out of commission. Since I had some plans for the PC over the weekend, I decided, at the risk of buying a new keyboard, to try to fix the problem.

Repairing your keyboard is not an insurmountable problem. However, it is not for the fainthearted.

Here are the steps for fixing it. I learned them the hard way because I did not do them in this order.

1. Remove every key from the keyboard except the spacebar. These keys pop out. You do so to relieve the spring tension that the keys exert on the back of the keyboard.

2. Turn the keyboard upside down and support the outer edges so that no spring is compressed.

3. Remove the two screws and the back cover plate.

4. Unplug and remove the cord from the keyboard.

5. Mark the upper- and lowercase halves in several places so you will have a reference for realignment when you put the keyboard back together again.

6. There are eight metal tabs holding the keyboard together. Use pliers to bend

these to remove the back cover, but do so gently and carefully.

7. Open the cover. The inside of the keyboard is really quite simple. You can clean any key contact that has been giving you problems, or as in my case, fix the spring on the spacebar.

8. When you have finished doing what you have to do (including satisfying your curiosity about how the inside of the keyboard looks), put the keyboard back together in reverse order.

Taking the keyboard apart is straightforward, but remember to remove the plastic keys before taking it apart. All keys pop out except the spacebar (leave the spacebar intact).

When I did it, I didn't remove the keys first, so the spring tension popped the key contacts out of their slots. It takes a long time to put the 82 key contacts back into their slots.

Herb Ganner
Hurst, Texas

These tips can be useful when you're under a deadline and your computer goes on the fritz, especially on the weekend or in the wee hours of the night. But I'd be careful about giving my add-on boards a permanent wave; skip the part about the hair dryer unless you like to live dangerously. And if you're having a heat problem, make sure there's some breathing room around the outside of the chassis. Some people stuff their PCs into tiny airless cubicles inside desks, or cover the vents with books, paper, and other computer ephemera. Let it breathe.

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PX-IV TAKES THE GOLD!

By Hyatt Venson

The crowd is ecstatic as Quimax congratulates their Hi-Res champion PX-IV. One observer at the Olympiad Mr. Misty Focus stated, "That PX-IV clearly demonstrated to the competition what a real winner is made of, superior pixel resolution like I've never seen before." Another observer Mr. Hunch Neckacker states "PX-IV displayed tremendous tilt and swivel action that looks fantastic from any position." Finally, Mr. Tex. Writer shouts, "PX-IV showed his switching versatility between color and green text display, he really knows how to turn it off and turn it on."

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PC Tutor

Give Pages a Break

Q: I use a Microline 83 printer with my IBM PC. When I use the TYPE command to print out a long file, there isn't a break at the end of each page because DOS overrides the printer's top-of-form (TOF) switch.

How can I instruct the printer to set a break at the end of a page? I think it would help matters if I could find where the TOF and last-file (LF) records are kept in memory.

G. A. Downsborough
State College, Pennsylvania

A: Actually, DOS doesn't store top-of-form (TOF) information anywhere; handling of it is left up to the applications programs.

To arrange for page breaks when you type a file from DOS, you should make sure that the TOF is set correctly on the printer whenever you power up the PC because the printer is reset at this time. You should also check the TOF each time you run BASIC, since BASIC also resets the printer.

Now you need to convince the printer to perform page skips on its own. I don't know the page-skip code used by Microline's printers; the IBM/Epson printers, however, use the Escape code (ASCII value 27).

With an Epson printer, I would first align the paper correctly and load BASIC. Then I'd run a page-skipping program, which is one line long, that makes the printer advance to the perforations and skip down six lines.

```
LPRI NT CHR# (27) + "N" + CHR# (6) ;
```

(You can change the number at the end of the BASIC statement to a top margin with more or fewer lines.)



To do the same with your Microline printer, look in its manual to see if there are any codes for automatic page breaks that can skip lines at the top or bottom of a page. If this feature is available, you can use these codes in a one-line BASIC program like the one I used for an Epson printer. If your printer doesn't offer codes for automatic line skipping at page breaks, you are out of luck.

Dealing out a Wild Card

Q: I made the mistake of saving a BASIC program under a filename that included an asterisk (*). Now I find I can't rename the program or transfer it onto another disk. I can't use DISKCOPY because the disk, where I'd like to put the BASIC program already has several files, which would be erased. What can I do?

Stacy Pakin
Chicago, Illinois

A: There's a simple solution to your problem. First, use DISKCOPY to make a copy (onto a blank disk) of the disk that contains your BASIC program. Then erase files on the new disk, until only the asterisk-infected file remains.

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PC TUTOR

RENAME *.* NOASTER

DOS will now rename all the files on that disk (quantity: one file) to the new name, NOASTER—a far more manageable name than one that contains an asterisk. Under the name of NOASTER, you can copy and rename your BASIC program easily.

It might not be necessary, however, to erase all the files on the disk. For example, if the troublesome file was the only batch file on the disk, you could take advantage of its unique suffix and use this command instead:

```
RENAME *.BAT NOASTER
```

Display Beats B: Drive

Several issues ago, Roland Brown asked a question involving problems with read errors on his system's B: drive ("Diagnostic Disk Magic," PC, Volume 3 Number 6, page 378).

A possible cause of Brown's problems was pointed out by Kim Jacobson of Milan, Michigan. She noted that IBM's Guide to Operations warns against placing a non-IBM display on top of the system unit—or anywhere within 12 inches of the system. Therefore, since an electrically noisy display had caused sporadic errors on drive B: in her system, she solved the problem by purchasing a monitor stand that raised the display further from the system unit.

Subdirectory Directions

Q: I need to use the subdirectories on my hard disk, but every time I look at the DOS 2.1 manual, my head starts to spin. Please explain how I can set up subdirectories and use them effectively.

Karina Zowick
Bethesda, Maryland

A: The new subdirectory commands, first made available with DOS 2.0, are extremely useful and are certainly worth learning. Your head should settle down once you see the first lesson, since there are only four subdirectory commands:

- MKDIR (abbreviated MD) makes a new subdirectory;
- RMDIR (abbreviated RD) removes a subdirectory;
- CHDIR (abbreviated CD) changes the working directory;
- PATH sets up a search path through subdirectories that programs can follow.

To give you an idea of how to use these commands, I'll explain how I set up and use the subdirectories on my system.

First, I decided to organize my hard disk so it would have no individual files in

The new subdirectory commands, first made available with DOS 2.0, are extremely useful and are certainly worth learning.

its root directory (the top level)—only subdirectories. Thus, after I formatted the hard disk, I had to create subdirectories immediately. To start with, I created a subdirectory for the DOS files, changed that subdirectory into my working directory, and copied the files from the A: drive's DOS disk into that subdirectory. These are the commands I entered:

```
C>MD \DOS  
C>CD \DOS  
C>COPY A:*. * C:
```

You can call on a file in a subdirectory at almost any time by using its full name in a DOS command such as this:

```
C>COPY C:\DOS20\FORMAT.COM A:
```

However, many programs that run under DOS can't follow paths. In a case like this, you have to change the working directory to be the subdirectory that the program needs. To change to the subdirectory that

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PC TUTOR

contains my text editor and its files, I'd use this CD command:

```
C>CD \EDIT
```

After this change, as far as the program is concerned, any reference to drive C: is taken to mean only the \EDIT subdirectory on the C: drive.

I also use the CD command to set up a standard heading that lets me use truncated filenames that are easier to type. For example, if every file I'd want from the A: drive was in the \BOOT subdirectory, I could type this:

```
C>CD A:\BOOT
```

Afterwards, every time I refer to the A: drive, the computer will act as if \BOOT appeared before every filename that didn't begin with a backslash. For example, after I entered the previous command, I can call on a file by typing either name:

```
A:\BOOT\EDIT\NEWOK
```

```
A:\EDIT\NETWORK
```

Note that the second, truncated name doesn't begin with a backslash.

Since subdirectories can be treated much like individual disk drives, you can copy files between them easily. If you had subdirectories on drive C: called \EDITNEW and \EDITOLD, the following command would copy the contents of \EDITNEW into \EDITOLD:

```
C>COPY \EDITNEW \EDITOLD
```

The PATH command is also a useful tool. I usually keep my programs and their data in different subdirectories; for example, my language compilers are in one subdirectory, and different versions or portions of the programs I write are in a separate subdirectory. The PATH command can help you run programs that aren't in your current working directory. A subdirectory path I frequently use is created with this command:

```
C>PATH C:\CMAJOR;C:\DOS
```

What is this PATH command's effect? When I request a file that isn't in my cur-

rent subdirectory, the operating system will search for it, first in the \CMAJOR subdirectory, which has my compilers, then in the \DOS subdirectory, which has DOS utility programs.

Since subdirectories can be treated much like individual disk drives, you can copy files between them easily.

The biggest problems involving subdirectories arise because many programs that run under DOS aren't prepared to recognize paths. This nonrecognition leads to trouble, for example, when a program uses overlay files—pieces of the full program—that are loaded at different points during operations. With a program like that (WordStar is one), if I wanted to keep the main program and its overlays in one subdirectory and its data files in another, I'd need to have, in effect, two current working subdirectories.

I can accomplish this end by creating a RAMdisk (called B:) that will hold the WordStar program and overlay files. Meanwhile, the text files can be located in \MANUSC, the current working subdirectory on the C: drive. Assuming that the RAMdisk for B: has already been created, the following commands will set up WordStar properly to work with the text in C:\MANUSC\MYFILE:

```
C>COPY \EDIT\WS.* B:
C>CD \MANUSC
C>B:
B>WS C:\MYFILE
```

The PC Tutor solves practical problems and explains points of general interest. If you'd like to see your questions answered here, drop a line to PC Tutor, PC Magazine, One Park Avenue, New York, NY 10016. ■

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You have 4 months to organize a task force to produce a major report for your company. The people you want to contribute to the report are based all over the country. You start calling on the phone. It takes at least three tries to get hold of each one. No single date is acceptable to more than half the group.

Victims of this all-too-familiar pattern ought to look at computer conferencing, a new and in many cases better way to get people jointly to tackle a problem. With a computer conference, you can get all the company's experts together—no matter where they happen to be physically or what time it is.

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An electronic "meeting" is modeled on the traditional face-to-face gathering. It begins when the chairman or moderator sets out a topic to be discussed or a task to be accomplished. He does this online. All participants call the central computer on which the conference is taking place to read what the chairman has said. They review his comments and those of others. Then they add their own.



An electronic meeting can last days or months. As it progresses, the chairman guides the discussion and summarizes thoughts. There are many obvious advantages to computer conferencing. There are no time or geographic restrictions. There is no telephone tag. There is no expensive travel, no waiting at the airport. A final report is easier to write because everyone's comments are available to read.

There are also some disadvantages. Text that is scrolling up a video screen cannot convey the nuances of speech or the skeptical arch of an eyebrow. Electronic dialogue can drift if it isn't closely monitored. Those who don't type or spell

well may be intimidated.

A New Dimension

Computer conferencing is still in its infancy. An estimated \$2 million was spent on it during 1983. Some experts predict that it will be a multibillion-dollar business by the 1990s. What we now see as electronic mail, some experts say, will be just one part of computer conferencing systems. With electronic mail you can send one message to one person or to many persons. Computer conferencing adds a very powerful new dimension: Many persons can talk back and forth to many others.

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TELECOMMUNICATIONS

er conference systems available. Most are designed to run on a company's own mainframe computer. At least three of these systems are easily available to anyone with a communicating computer. Participate, which is on The Source at regular connect rates, is the most easily accessible.

The EIES System

The Electronic Information Exchange System (EIES, pronounced "eyes") is also available to the personal computer owner. It is at the New Jersey Institute of Technology. Although it is dedicated to research in the computer conferencing field, it has an increasing number of commercial customers. EIES also has a group discount.

Computer conferencing is moderately complex. The hardest part is overcoming your initial awkwardness. Think of computer conferencing as a survival skill. Participate is a good cheap place to start.

The Source manual devotes 20 pages to Participate. If you sit right down and study the manual, however, you're likely never to try the system. Fortunately, there is an excellent practice conference on-line. Once you have used that, the manual will make more sense.

Learning to Participate

You get to Participate by typing PARTI at The Source's main prompt. The initial menu will ask whether you want an overview, instructions, a list of principal conferences, or to begin to participate. I'd suggest you run the list, printing a copy of the overview, the instructions, and the list of conferences you can join. Then you can "begin to participate." As soon as you select this option, you fill out a questionnaire that sets the system format to match your equipment. More importantly, you give yourself a name and describe yourself briefly. Start your practice session at the ACTION prompt. Your screen will look like this:

ACTION—Read, Write, Other?

Type READ "PRACTICE." You get the following response: "PRACTICE" Conference 82.5107 HELPER, organizer, about "A PLACE TO LEARN THE SYSTEM, AND TO MAKE MISTAKES."

The name of the conference is always enclosed in quotation marks. It is also identified by a number. The word following the number is the Participate name of the person who organized the conference. A one-line description of

Computer
conferencing is
moderately complex.
Think of it as a
survival tool.

the conference follows.

A Participate conference can sprout a thicket of "branches." The main conference discussion may suggest an important side issue. At that point one of the participants might launch his own conference. The new branch conference might just be a short discussion to clear up the issue. Or it might attract the main action. On Participate the principal conference is called "Parti."

Some experts don't like conference systems that branch, arguing that you get lost among the twigs. You can inventory the branches of a Participate conference by typing PROFILE, the name of the conference, and C to get a list of the subconferences.

Planning Your Own

Once you have worked through the practice conference, you will know enough to be able to rummage around in Participate. You will learn how to use the "scratchpad," an editor on which you compose messages. And you will learn how to start your own conference. At a Participate prompt, select W so you can write a message. At the ENTER TEXT:

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Management Strategy

In California, the Western Behavioral Sciences Institute is using computer conferences to teach management strategy. Businessmen are initiated in standard meetings. Then they go home and learn at their terminals. They report that it is a healthy business to argue on-line with an

Your conference can
have people
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important figure, something they might never do in person. More importantly, they can fit their "classes" into small blocks of time during the day.

One small computer conference is actually an interactive newsletter. Arthur S. Bechhoefer runs Independent Investors Forum on the Confer II computer conference program. The Washington-based service costs \$300 a year. Bechhoefer writes short articles offering investment advice and lists of stocks to buy and sell. His clients, including one in the Philippines, call in to read. Sometimes a client strongly disagrees with the advice and a lively discussion follows. After using a service like IIF, I suspect a dedicated investor would find himself hopelessly addicted. ■

William J. Cook is a senior correspondent in Newsweek's Washington Bureau. He has reported extensively on energy, economics, and high technology.

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Columns

The Editor's Wire by Corey Sandler, Screen Play by Don Kennedy, Communications Networks by Eric Freedman, Opinion by Lindsay Van Gelder, Looking at Logo by Winn L. Rosch, Education by Martin Porter, It's BASIC by John M. Woram, Reader to Reader by Paul Somerson, and Junior Explorer by Peter Norton.

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Significant Figures

The PC uses floating-point routines to represent fractions and work with numbers larger than 65,535—the largest number representable in 16 bits. The first in this three-part series on floating-point routines covers addition and subtraction. Assembly-language programmers will learn everything they need to know to do floating-point arithmetic.

Object Module Librarians

POLYLIBRARIAN and SR-LIB are two utilities that manage libraries of special-purpose routines.

Formatting Pascal

TIDY and Pascal Utilities produce properly formatted code without the pain of manually typing in indentations and uppercase letters.

DOS Shells

These utilities hide some of the details and intricate syntax of DOS, reducing confusion and increasing efficiency.

From BASIC to C

C is rapidly replacing BASIC as the favored language and as a result, new products are emerging to translate programs from BASIC into C. *PC Tech Journal* reviews two of these—*BASIC C* and *BASTOC*.

Relay Review

PC Tech Journal checks out a powerful, feature-packed communications package from VM Personal Computing, Inc.

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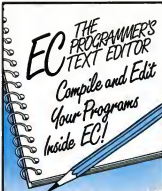
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Sound Tutor

Don't just look at your computer; listen to it, too. *Sound Tutor* will explain how to generate sound with your PC. First listen to the various sample sound effects, then list the code behind each example. Once you understand the four methods used to generate these sound effects—immediate data, generated data, step loops, and DATA statements—you can incorporate the codes into your own BASIC programs.



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Coming Up



Word Processing on a Budget

Starving writers can feast their PCs on word processing programs without devouring their budgets with the six word processors we will review. Marilyn Fleming has looked at packages costing \$100 or less, requiring no more than 128K RAM, and running on one single-sided disk drive. To her surprise, she found that these programs compare favorably with packages selling for \$300 or more!

Project Management Software, Part 1

Project management software is designed to help managers plan projects from the time of their conception to their implementation. *PC Magazine* will investigate and test some of the project management software on the market in a three-part series. In Part 1 and Part 2, we will review packages that are chiefly useful in the planning stages of a project. Part 3 will include reviews of packages that help with initial planning and with the later stages of project management as well.

Three Packages for Technical Analysis Go for the Gold

We'll review three packages that could help you strike gold on Wall Street. For the price-conscious investor who doesn't need fancy features, we'll take a look at *Stock Trader*. For the technical investor, we'll examine *Technical Investor* and *Winning on Wall Street*, which are crammed with analysis tools. *PC* will try to help you decide which one best meets your needs.

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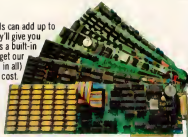
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